

# THE IRON AGE

Established  
1855

New York, May 11, 1911

VOL. 87: NO. 19

Published Every Thursday by the

DAVID WILLIAMS COMPANY  
239 West 39th Street, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada, \$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.  
Single Copies 20 Cents.

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## Further Rail Buying

### A 40,000-Ton Order from the St. Paul

### Low Prices on Bar Iron—Large Sales of Southern Iron—The Steel Corporation's Orders

The meetings of the steel manufacturers in New York in the past week have thrown little light on the situation. What was most marked was the resignation of the leaders of the industry to a condition of inactivity that has few parallels. That the question of prices was not the live issue it has been at other meetings shows that buyers are too indifferent even to make a serious effort to depress the market.

While the manufacturers agree that sales cannot be forced under such conditions, some take a more serious view than others of the immediate future. These see in legislative developments the possibility of changes in standards which may have a far-reaching effect upon values, and this explains to their minds the paralysis which has overtaken demand.

Actual developments in the market have been meager, but are rather unfavorable than otherwise. A disturbing factor in the Lake ore trade has been the sales of scattering lots of non-Bessemer ores at cut prices. It is pointed out that the ores in question are at a disadvantage as to ease of furnace working, but the fact that they have sold below the parity determined by their analysis has been given significance.

Sales of Southern iron for quick shipment have been made at \$10.75 and in some cases at \$10.50 for No. 2 at Birmingham, and this weakness has developed in a very listless market. For delivery through the year \$11 is generally maintained and the low priced sales were made to realize on unwieldy stocks. Sales of Southern iron, chiefly to pipe companies, have amounted to more than 50,000 tons, the bulk of it being sold by the larger producers.

At Buffalo a better demand for foundry iron has appeared in the past few days, but in general Northern buyers of foundry irons are holding aloof.

A sale of 5000 tons of basic iron has been made in eastern Pennsylvania and negotiations are pending for a round lot for another steel company. Other business has been offered at a price below \$15, delivered, which furnaces refuse to consider. Low prices were brought out by an Ohio inquiry for 3000 tons of basic iron, but the business has not been closed. A steel foundry interest is inquiring for 5000 tons of basic for its Alliance, Ohio, and St. Louis district plants.

The operations of a number of rolling mills have fallen below 50 per cent. and steel companies are adjusting their pig iron output to the new situation as rapidly as possible. One steel company is blowing out two Shenango Valley furnaces this week. The Steel Corporation has 62 per cent. of its blast furnace capacity going.

There has been a further decline in bar iron in both Eastern and Western markets, and while the buying has not been large it has raised a question as to the maintenance of steel bar prices. Implement buyers are influenced by pending legislation affecting farming interests and there is continued uncertainty as to bar contracts usually placed before June.

The steel for the Woolworth Building, New York, 22,000 tons, has been placed with the American Bridge Company. In the West structural buying has been generally light.

For the battleship New York the contract for plates, 6500 tons, has been given to Worth Brothers. About 3100 tons of shapes are yet to be awarded. Los Angeles is planning to build an aqueduct which will take 4500 tons of plates.

The Louisville & Nashville has bought 15,000 tons of rails from the Tennessee Coal, Iron & Railroad Company, and the St. Paul has closed for 40,000 tons with the Illinois Steel Company, half of it for prompt shipment. The Kansas City Southern is in the market for 14,000 tons. The Monon has bought 4,000 tons. Of the Seaboard Air Line order 3700 tons went to Sparrow's Point, 4000 tons to Bethlehem and 7500 tons to Ensley.

Among wrought pipe sales are reported 2000 tons of 6-in. pipe for a Wyoming line and 8000 tons of 8-in. pipe for the Mexican Petroleum Company.

The United States Steel Corporation's unfilled orders April 30 were 3,218,704 tons, against 3,447,301 tons reported for March 31, a falling off of 229,000 tons.

#### Pig Iron Costs in Alabama

The cost of making pig iron in the Birmingham, Ala., district has come up again in connection with the discussion, started at Washington, of the ability of that district to stand the addition of certain steel products to the free list. Again it has turned out that boastful statements of low cost of production made in the interest of a particular district or producing company have returned to plague the authors. Yet it would seem unnecessary to say over and over that costs reached in a time of the direst industrial distress the country has seen are no proof of ability to give an adequate return to capital and maintain any such wage rates as to-day's on the same market price.

Vice-President J. W. McQueen, of the Sloss-Sheffield Coal & Iron Company, writing in the Birmingham *Age-Herald* of the claims made as to the low cost of pig iron production at Birmingham, based on the exports of pig iron from that district to Europe in 1896 and 1897, tells what is well known in the iron trade of the basis on which such exports were made:

It was so exported without a dollar of profit to keep plants going and men employed to avoid a disruption of organizations at a time when Southern furnace companies were so poor that they could not have closed down and met their obligations. In counting the cost of such iron no allowance was made for the minerals taken out of the ground or the cost of replacing the land so exhausted; it was a matter of temporary expediency which if persisted in would have ruined the district exporting its valuable minerals for other people to work them up with cheap labor and return the finished products to our country.

In those days the cost of living was 60 per cent of what it is to-day, and wages were correspondingly low. If it becomes necessary again to produce pig iron at Mr. Underwood's figure—\$7.50 per ton—it will become necessary to accompany it by a 40 per cent reduction in all labor costs. At that time also the outer ore of Red Mountain, averaging 50 per cent in richness, were being mined by hand power, and loaded at trifling cost, in some cases not exceeding 50 cents per ton. It is now necessary to have expensive power plants, the soft ores having been exhausted, to follow the 32 to 38 per cent ores, in some cases even below the sea

level, with expensive drilling, hoisting, ventilating and pumping. Similar increases have followed in many cases the operation of coal mines, where the more accessible outcrops have long since been attacked, and operations are now pursued following the operation of deep shafts and slopes with expensive systems of underground haulage. \* \* \*

When iron was made cheaper in this district, day labor was getting from 85c to \$1 a day; the miner for cutting coal, 37½c per ton, and some mines lower than this; while now day labor is getting from \$1.25 to \$1.75, and the miner for cutting coal, 52½c and some mines more than this.

The tenacity with which some minds grip the idea that cost is a fixed quantity is only equaled by their persistence in thinking that a selling price fixed by the urgent necessities of a time of depression should be repeated indefinitely in prosperous times. It is evident that the claim of a \$7.50 pig iron cost in the Birmingham district has been about as useful to the industry there as the widely quoted remark of a Northern steel manufacturer concerning a \$12 rail cost has been to the steel rail producers of the country.

#### The New Art in Automobile Building

Shoddy-built automobiles soon begin to look shabby. But some automobiles of high price share this shortcoming. To remain presentable they require more than elaborate caretaking. Repairs relating mainly to their appearance take them out of commission with a frequency not paralleled in ordinary carriages. The bills, too, are annoying, partly because the auditing of them is irksome. And owners of automobiles, who have been more lenient in the past with the appearance of their automobiles than with that of their carriages, their persons or their houses, are now very generally reaching the point of demanding full service in style as well as in mechanical reliability. They demand that it shall be possible to keep the automobile very neat and trim long after its body shape may have become outfashioned, and that the price and trouble in doing so shall, of course, be at a minimum.

Certain fenders are easily crumpled or twisted. Certain motor hoods are liable to become scratched and dented, because they are in the way when the motor is looked after and the workman leans on them and puts tools on them, or they are too thin or shaped so as to lack strength and springiness; the enamel cracks off of them. Certain springs get rusty because the paint does not stick to them; others creak in the joints for lack of bushings in eyes and shackles and for lack of oil cups. Certain tire shoes ravel, and certain armor bands gather dirt at the sides, while others really make the whole wheel appear more businesslike and fit. Certain drip pans, besides adding to the fire risk in garages, are permanently dirty or permanently rusty, because their construction, involving large apertures, makes a convenient cleaning process, with a hose, inadvisable. Certain upholsterings are anything but weatherproof and soon look cracked, grimy and faded. Certain rear wheels in conjunction with the brake-drum attachments lose their varnish and paint quickly, because mud has to be scraped and wiped off. It is possible to go through the whole list of parts and accessories of an up-to-date automobile and pick distinct preferences in design, types and arrangements wholly according to the greater or lesser amount of work, trouble and cost involved in keeping the vehicle looking trim and neat for a series of years. And all these minute considerations are, of course, to be reconciled with the operative requirements which have almost monopolized at-

tention in the past years, but which for lack of extensive experience in determining the conditions for a substantial durability have been viewed in many instances without systematic regard for the data of upkeep cost and depreciation.

The new art in automobile building seems to be nothing more nor less than a sharp accentuation of all those factors, often apparently minute, which bear upon the maintenance of a maximum value for the automobile in the second, third, fourth, fifth, perhaps the tenth year of its usefulness. All first-class manufacturers have, of course, always recognized the claims of this art. Their recognition of it was largely what gave them class over and above their competitors. But it is only lately that a sufficient volume of data on upkeep cost and depreciation has become available to permit a systematic cultivation of the art. In this sense it is new. It rests on the keeping of records with actuarial accuracy, the records telling just how and when, in the life of an automobile, its normal use leads up to the necessity for new expense. Some of the records are in the possession of manufacturers who keep them secret for their own guidance. They are not accurate nor exhaustive; they apply somewhat indiscriminately to automobiles of slightly varying design and materials; but, such as they are, they tell a story which leads to improvements which reduce the annual depreciation. Better records, more unbiased and more essential, in applying to many different types of automobiles with sharp distinction as to whether the data apply to one type or another, are in the hands of the automobile insurance companies and are guarded with jealous care, as their proper interpretation spells rates for premiums and for the yearly reduction of the insurance principal. The taxicab companies have accumulated data of high value in this branch of the industry, and the express companies and other large users of motor trucks and delivery wagons, who keep an account for each vehicle in their service, should be able to give most valuable pointers to the manufacturers whose products they employ, and have, in fact, given many such in the past. In these data generalities count for nothing, specific facts for everything. It is in truth the function and value of these specific facts that they round off and supplement the more generalized knowledge of construction science by which the designing engineer was guided in the first place.

The purchaser of automobiles is naturally interested in having the automobile industry in its entirety become deeply impressed with the necessity for studying the ways and means for increasing durability in all details and thereby reducing depreciation. A closer union of mechanics, art and general industrial experience than has heretofore been the rule is to this end desirable, but the first requisite of all is that both manufacturers and purchasers—the latter mainly for the sake of control and to spur on real efforts—become acquainted with the data of depreciation, which are also the data of maintenance cost seen in its relation to specific construction and materials. Publicity for the data already gathered would constitute the most effective means, but is opposed by private interests. There remains a public discussion of details to which all may contribute from their individual experience and which by degrees will be rounded off into a respectable aggregation of facts. The subject has been broached in Germany, and there is presented elsewhere

in this issue an extract from one of the articles appearing there. It will give an idea of what is expected of a pleasure automobile in Germany, by the insurance companies, and the schedule of repair "expectations" which it offers may be compared by the owner of American automobiles with the facts of his own experience, arranged in similar schedule form. The result could not help being of interest. A number of such schedules, although the specific construction may remain unrevealed in each instance, would at least disclose how much longer corresponding parts remain in good condition in one case than in another, and this knowledge gained by the owner would not be slow in reaching the maker who still lags behind and fails to provide his product with a "good constitution."

### Price Concessions on Export Trade

Whereas the sale of manufactured products in the foreign trade at prices below those prevailing at home is generally charged upon protection countries like Germany and the United States, as growing out of their fiscal system, we note that one of our London exchanges finds fault with the same practice in Great Britain. The *Ironmonger* says that the Association of Bar Iron Manufacturers in Lancashire charges the home consumer £6 15s. per ton for crown bar iron, while "it is necessary, in order to get rid of the surplus, to sell large quantities for export at from 7s. 6d. to 10s. a ton below the association's price to home buyers." Then we are told that "the British home trade pays for the reduced rates for export," just as "the American consumer pays for the cheap semifinished steel which the Americans dump here."

The question is so old that we refer to the Lancashire bar iron case not so much to comment upon it as to show that the issue is bound to come up wherever there is an inner and an outer trade. For a manufacturer to sell all his product at the price made by the sharpest competition he meets anywhere in the world's markets would seriously curtail his profits. It is one way of putting it to say that his home customers who pay his usual price pay for the concession he makes on distant business. They pay for it in the same way, let us say, in which they pay for the product he sells to concerns from which he is unable to collect anything—the way, in fact, in which they pay for every other expense of his business. There is a question of expediency in all these concessions to secure distant foreign trade. If the industrial countries of the world were able to parcel out the business so that the producing country nearest a given market would supply that market the whole matter would be simplified. Some such arrangement is aimed at now and then, but it is exceptional. The web of the world's trade is so tangled, and political and national lines so connect widely separated countries, that economic considerations are often a small factor in determining the placing of an order.

It is common to condemn the sales various steel-making countries make to countries having no steel industry, and to inveigh against a condition under which countries that do not make steel pay the lowest price for it. Yet perhaps there is less to condemn in low prices on neutral ground, where several producing companies compete sharply for an order, than in the practice, once much more common than it is to-day so far as the steel trade is concerned, of dumping product

on a foreign producer's territory for the sake of making a hot pace for him at home. It is forgotten in some of the criticisms of lower prices to the buyer in a non-producing country that the price such a country pays may yet be higher, gauged by ability to pay, than that prevailing in the country of production. In other words, the basis of price which increases the use of steel in one country must necessarily be lower than that which will make a large demand for it in the country of production.

Divesting the question of all political and tariff phases, it comes down to a matter of national standards of value and of living. The buyer of material which enters into manufacture considers that he is handicapped in world markets if he must meet there a product into which similar material entered, which his foreign competitor bought at a concession from the same home producer. Yet, with all the unpopularity of the differential to a foreign buyer, it is quite certain that the alternative of such a general lowering of home standards as would permit the home manufacturer to sell all his product on the same low basis would be far more unpopular. It is an economic question, involving adjustments of far-reaching influence, and the problem will exist whatever may be the scale of duties on imports. In the effort to solve it, there must be weighed against individual inequalities or hardships the value of an export outlet for home products—one that can be counted upon, whatever the conditions at home. A price must be paid for it; of that there should be no doubt. It should not be difficult to decide, moreover, that a greater price would be involved in going without it.

## Correspondence

### Electric Steel Production at Dommeldingen

*To the Editor:* Referring to your issue of May 4, in the article entitled "Electric Steel Production at a German Works," a slight error was made in the second paragraph, in which it says that a  $1\frac{1}{2}$  ton furnace takes direct current. This should be 3-phase, alternating current of 50 cycles. It might also be of interest to your readers to know that all of the steel produced at the works of Le Gallais, Metz & Co., at Dommeldingen, is electric steel made in in the Roehling-Rodenhauser furnace.

AMERICAN ELECTRIC FURNACE COMPANY.

## The Machinists' Strike in New York and New Jersey

In Greater New York and Hudson County, N. J., 92 firms which have refused to grant the demand of the International Association of Machinists of the 15th District for an eight-hour day, have joined interests in fighting the strike which went into effect May 1. The committee of ten, consisting of five representatives of firms in the National Metal Trades Association and five representatives of firms not affiliated, has been appointed to handle the situation during the strike. The committee consists of H. N. Covell, Lidgerwood Mfg. Company; Stevenson Taylor, Quintard Iron Works; Andrew Fletcher, W. & A. Fletcher Company; George E. Franquist, Simplex Auto Company, and William J. Davidson, Staten Island Shipbuilding Company, representing the National Metal Trades Association, and the following representatives of the independent firms: Walter S. Smith, E. W. Bliss & Co.; William J. Blair, Blair Tool & Machine Works; Edwin E. Sherman, James Sherman & Sons; Walter H. Gill, P. H. Gill & Son; Conrad Hubert, American Ever Ready Company.

Commissioner Robert Wuest of the National Metal Trades Association, who is filling the places of the strik-

ers, has issued a statement that only 1268 machinists have left their employment in shops owned by members of the Metal Trades Association. The strike was declared in only five shops operated by the association, and from only two of these shops all of the machinists went on strike. Mr. Wuest's report includes the statement that an encouraging feature of the situation is the fact that the members do not require all the machinists brought to New York to take the places vacated by the strikers. The union leaders declare that over 16,000 machinists are on strike, but the employers' committee places the number at 9000. R. Hoe & Co., manufacturers of printing presses, in a circular letter to their customers, explain their position regarding the strike as follows:

It is a serious matter to us, and to the publishers and printers as well, because the hours of work were not long ago reduced from ten to nine, and, in addition, wages have been steadily advanced and the cost of materials has greatly increased. We have reduced the prices of our presses by taking advantage of every improved method and appliance in manufacturing, until the lowest possible point has been reached, and any further shortening of the working day would necessitate a corresponding increase in the selling prices of presses. To run the shop but eight hours daily and continue the present output would necessitate increasing our plant by one-ninth, a proposition so serious that it cannot be considered for a moment, in the present condition of the printing press business.

## Employers' Liability in New York State

In view of the New York Court of Appeals decision declaring unconstitutional the compulsory compensation law placed on the statute books as a result of the work of the Wainwright employers' liability commission, the commission submitted another report to the Legislature at Albany last week discussing the methods by which what was desired to be accomplished in that law can be secured for the workmen of the State. The best plan, the report says, is to amend the constitution, authorizing the Legislature to provide for the payment of compensation, with or without the right of trial by jury and with or without regard to fault, to employees injured by accidents of employment or to persons dependent upon them. Of the objection that such an amendment would leave unaffected the "due process" clause of the Federal Constitution the report says that from a careful study of United States Supreme Court decisions, there is good ground for expecting that in interpreting the "due process" clause the court will hold that reasonable legislation for the establishment of a compulsory compensation or insurance plan may be sustained as a legitimate exercise of the police power, particularly where there is a provision in the Constitution of the State enacting such legislation which expressly authorizes this method of dealing with industrial accidents.

## The Blaisdell Machinery Company

The Blaisdell Machinery Company, Bradford, Pa., has opened a Pittsburgh office at 907 People's National Bank Building, in charge of J. M. Read. The business in the Pittsburgh district was formerly handled from the main office in Bradford. The company is manufacturing a very high grade of entirely inclosed self-oiling compressors and a line of vacuum cleaning machinery which embodies some of the latest and most advanced ideas in this work. Another product of the company is the Blaisdell automatic sewage ejector, used for raising sewage or other waste from below the same level. It is being used to a large extent in office buildings and for municipal plants where sewage by gravity is not possible. The company is installing a large municipal plant in Plainfield, N. J., which is designed to care for over 400 gal. of sewage per min. and is operated by electrically driven air compressors equipped with automatic controls. As the business of the company is steadily increasing, the opening of other offices within the next few months is contemplated.

The Ohio Society of Mechanical, Electrical and Steam Engineers will hold its twenty-third meeting May 18 and 19, in the Elks Club Auditorium, Youngstown, Ohio. An interesting programme has been issued, which gives the titles of quite a number of engineering papers to be read, together with details of excursions to be made to industries in the locality.

### Lake Iron Ore Shipments in April

The April shipments of Lake Superior iron ore from upper lake docks were but little more than one-fifth of those in April, 1910—331,645 gross tons against 1,520,305 tons. The record for the various ports is as follows, with comparison with 1910:

	Gross Tons.	
	April, 1911.	April, 1910.
Escanaba .....	93,532	223,025
Marquette .....	14,838	135,559
Ashland .....	41,337	218,703
Superior .....	76,739	355,307
Duluth .....	51,042	309,427
	<hr/> 331,645	<hr/> 1,520,305

The Franklin Machinery Company, Franklin, Pa., builder of high grade horizontal and universal boring, drilling and milling machines and power milling machines, has appointed Manning, Maxwell & Moore its sales representatives for the greater portion of the United States and also to handle its sales in Japan and China. The company has excellent connections with foundry and other outside machine interests which enables it to contract for quite a number of its machine tools at one time for installation at a later date. The company also endeavors at all times to have a certain number of machines going through the process of construction so that its stock of machines for immediate shipment permits of selection and quick replacement. It is about to install another gas engine and is considering both an individual engine and a direct-connected engine and generator for power and lighting. Its plant is built on the unit plan, and can be added to in a comparatively short time when desirable.

### The Vulcan Detinning Company's Year

The Vulcan Detinning Company reports its net profits for the year ended March 31, 1911, after an allowance for depreciation, at \$110,056. The payment of preferred dividends, amounting to \$82,500, left \$27,556 to be added to surplus. President Eugene E. Spiegelberg says: "The slack condition of trade which has prevailed in most lines of business during the year, and the resulting unfavorable position of the steel market for the larger part of the period had a depressing influence upon the sale of our steel scrap product and upon the prices obtained for it. On the other hand, the price of pig tin, which likewise forms part of our output, experienced a considerable advance, beginning in July, 1910, and thereby offset to some degree the recession in steel scrap. In our proceedings against the American Can Company for an accounting of profits made by it in detinning by our process, the taking of testimony before the special master, William J. Magie, is completed, the arguments by opposing counsel have been made, and briefs are now being submitted. The finding of the special master should be handed to the court of chancery before very long, from which finding there may be an appeal."

The United Engineering & Foundry Company, Pittsburgh, has received a contract from Dilworth, Porter & Co., Ltd., of that city, for the building of a new 18-in. mill for rolling tie plates. The mill will consist of 2 stands of 18-in. 3-high rolls with pinions, tilting tables, transverses runouts, etc. The mill will be motor driven, with rope drive.

The National Tube Company, Pittsburgh, has received an order for 40 miles of 6-in. steel pipe for shipment to Wyoming.

The Wheeling Mold & Foundry Company, Wheeling, W. Va., has received an order from the Portsmouth Steel Company, Portsmouth, O., for the building of four hot sheet mills and other equipment.

A course in mining engineering is to be established in Sibley College, the mechanical engineering school of Cornell University. To supplement the theoretical work in mining and metallurgy it is planned to provide summer work in mining districts.

### The Hess Steel Castings Company

The new foundry of the Hess Steel Castings Company, Bridgeton, N. J., is now completed and castings are being poured. The process is a new one, originating with the Flexilis Werke, of Germany, and it opens new possibilities in the economical production of automobile and engine parts, high-pressure piping, and other difficult shapes where the quantity or form does not justify the use of dies.

Castings made of this process can be poured in intricate shapes quite unknown in the steel founder's art as hitherto practiced. For example, thin ribs can be set on thick sections with small fillets and with no sponginess of texture where the light and heavy sections join. The allowance required for finishing is also very small, partly because the shrinkage is uniform, but chiefly because the metal is sound from the surface down, rendering it unnecessary to machine off from one-fourth to one-half inch in order to reach good metal. Another advantage of the process is the small time necessary for annealing, only a few hours being usually required.

The Associated Foundry Foremen of Philadelphia and Vicinity held their regular monthly meeting at the Manufacturers' Club, Philadelphia, Pa., on the evening of May 9 with Vice-president James Whitehead in the chair. R. T. Thum, representing the Girard Iron Works, Philadelphia, was elected a delegate to attend the convention of the Associated Foundry Foremen, at the Pittsburgh convention May 23 to 27. Action on the revision of the by-laws of the association was deferred until the June meeting. The paper for the evening's discussion was on "Methods of Coke Manufacture" by C. M. Schwerin, manager Vinton Colliery Company, New York. He described in detail the formation and adaptability of various coals for coking purposes, the various ovens, from the old beehive to the modern by-product types, and the adaptability of various classes of coke for foundry and general metallurgical practice. In the discussion which followed the reading of the paper, the question of melting ratio, the methods of charging cupolas and other points of interest in connection with foundry practice were brought out. A vote of thanks was extended Mr. Schwerin for his interesting paper, after which the meeting adjourned.

**The Haskell & Barker Steel Car Plant.**—The Haskell & Barker Car Company, Michigan City, Ind., states that its recent purchase of land will be used for the purpose of erecting new shops, the board of trustees having voted to expend \$1,250,000 in enlarging and improving the plant. The present facilities of the company are limited to steel underframe cars, but with the contemplated improvements it will build all steel cars. Later the company also expects to take up the manufacture of front end steel cars for passenger trains. It further contemplates the installation of a steel foundry for the manufacture of cast-steel truck frames, cast-steel couplers, etc., its present foundries being devoted to malleable, gray iron, wheel and brass work.

The Interstate Steel & Supply Company, 5102 Jenkins Arcade Building, Pittsburgh, of which C. T. Herron is president and treasurer, deals in iron, steel, coal, coke, sheets, and mine, mill and foundry supplies, and makes a specialty of Conneaut shovels and spades, made by the Conneaut Shovel Company, Conneaut, Ohio, and hickory handles for axes, hammers, sledges, etc., made by the Beamer Handle Company, Manor, Pa.

The proposed investigation of the United States Steel Corporation by Congress, it is believed, will force the government to make public the result of the thorough inquiry into its affairs by the Department of Commerce and Labor. It is known privately that this investigation has resulted in complete vindication of the corporation, both as a legal and manufacturing organization.

The Keystone Bronze Company, Pittsburgh, Pa., is installing some new machinery at its Brighton Works, New Brighton, Pa., and also at its Pittsburgh Works at Thirty-ninth street in that city. No additions are being made to buildings, and no material extensions are contemplated at present.

# The Iron and Metal Markets

## A Comparison of Prices

**Advances Over the Previous Week in Heavy Type,  
Declines in Italics.**

At date, one week, one month and one year previous.

May 10, May 3, Apr. 12, May 11.

PIG IRON, Per Gross Ton:	1911.	1911.	1911.	1910.
Foundry No. 2, standard, Philadelphia	\$15.50	\$15.50	\$15.50	\$17.00
Foundry No. 2, Valley furnace	13.75	13.75	13.75	15.50
Foundry No. 2, Southern, Cincinnati	14.25	14.25	14.25	15.25
Foundry No. 2, Birmingham, Ala.	11.00	11.00	11.00	12.00
Foundry No. 2, local, at furnace, Chicago*	15.00	15.00	15.50	17.00
Basic, delivered, eastern Pa.	15.00	15.00	15.25	17.00
Basic, Valley furnace	13.50	13.60	13.75	15.25
Bessemer, Pittsburgh	15.90	15.90	15.90	17.90
Bray forge, Pittsburgh	14.40	14.40	14.40	15.90
Lake Superior charcoal, Chicago	17.50	17.50	17.50	18.50

## COKE, CONNELLSVILLE,

Per Net Ton, at oven:

Furnace coke, prompt shipment	1.55	1.55	1.60	1.65
Furnace coke, future delivery	1.75	1.75	1.75	1.80
Foundry coke, prompt shipment	1.85	1.90	2.00	2.15
Foundry coke, future delivery	2.10	2.15	2.25	2.35

## BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh	23.00	23.00	23.00	26.50
Forging billets, Pittsburgh	28.00	28.00	28.00	32.00
Open hearth billets, Philadelphia	25.40	25.40	25.40	29.00
Wire rods, Pittsburgh	29.00	29.00	29.00	32.00

## OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago	14.00	14.25	14.50	17.50
Iron rails, Philadelphia	16.75	16.75	17.50	20.00
Car wheels, Chicago	12.75	13.25	13.25	16.00
Car wheels, Philadelphia	13.00	13.00	13.25	15.00
Heavy steel scrap, Pittsburgh	12.50	12.50	13.25	15.50
Heavy steel scrap, Chicago	10.25	11.50	11.50	13.50
Heavy steel scrap, Philadelphia	13.00	13.00	13.50	15.00

## FINISHED IRON AND STEEL,

Per Pound:

Bessemer steel rails, heavy, at mill	Cents. 1.25	Cents. 1.25	Cents. 1.25	Cents. 1.25
Refined iron bars, Philadelphia	1.32½	1.32½	1.37½	1.50
Common iron bars, Chicago	1.22½	1.25	1.25	1.50
Common iron bars, Pittsburgh	1.30	1.32½	1.35	1.55
Steel bars, tidewater, New York	1.56	1.56	1.56	1.61
Steel bars, Pittsburgh	1.40	1.40	1.40	1.45
Tank plates, tidewater, New York	1.56	1.56	1.56	1.66
Tank plates, Pittsburgh	1.40	1.40	1.40	1.50
Beams, tidewater, New York	1.56	1.56	1.56	1.66
Beams, Pittsburgh	1.40	1.40	1.40	1.50
Angles, tidewater, New York	1.56	1.56	1.56	1.66
Angles, Pittsburgh	1.40	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh	1.30	1.30	1.30	1.50
Skelp, sheared steel, Pittsburgh	1.35	1.35	1.35	1.60

## SHEETS, NAILS AND WIRE,

Per Pound:

Sheets, black, No. 28, Pittsburgh	Cents. 2.20	Cents. 2.20	Cents. 2.20	Cents. 2.40
Wire nails, Pittsburgh†	1.80	1.80	1.80	1.85
Cut nails, Pittsburgh	1.60	1.60	1.70	1.85
Barb wire, galvanized, Pittsburgh†	2.10	2.10	2.10	2.15

\*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

†These prices are for largest lots to jobbers.

## Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets. Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

**Structural Material.**—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c. net; I-beams over 15 in., 1.50c. to 1.55c. net; H-beams over 8-in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, 1/4 in. and up, 1.40c. to 1.45c. net; angles over 6 in., 1.50c. to 1.55c. net; angles, 3 in.,

on one or both legs, less than 1/4 in. thick, 1.45c. plus full extras as per steel bar card effective September 1, 1909; tees, 3 in. and up, 1.45c. net; zees, 3 in. and up, 1.40c. to 1.45c. net; angles, channels and tees, under 3 in., 1.45c. base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c. net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c. net.

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, 1/4-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered 1/4-in. plates. Plates over 72 in. wide must be ordered 1/4-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under 1/4-in. to and including 3-16-in. on thinnest edge	\$.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates) 3 ft. and over in length	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in. inclusive	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft.	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths or diameters under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS.—Net cash 30 days.

**Sheets.**—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, as are follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; Nos. 27, 2.15c.; Nos. 28, 2.20c.; Nos. 29, 2.25c.; Nos. 30, 2.35c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; Nos. 27, 2.25c.; Nos. 28, 2.30c.; Nos. 29, 2.35c.; Nos. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; Nos. 27, 3.05c.; Nos. 28, 3.20c.; Nos. 29, 3.30c.; Nos. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

**Wrought Pipe.**—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

Butt Weld.	Steel. Black. Galv.	Iron. Black. Galv.
1 to 1½ in.	49	43
½ in.	75	71
¾ to 1½ in.	79	75
2 to 3 in.	80	76
Lap Weld.		
2 in.	66	62
2½ to 4 in.	68	64
4½ to 6 in.	77	73
7 to 12 in.	75	71
13 to 15 in.	51½	..
Butt Weld, extra strong, plain ends, card weight.		
½ in., ¾, ¾ in.	69	65
½ in.	74	70
¾ to 1½ in.	78	74
2 to 3 in.	79	75
Lap Weld, extra strong, plain ends, card weight.		
2 in.	75	71
2½ to 4 in.	77	73
4½ to 6 in.	76	72
7 to 8 in.	69	65
9 to 12 in.	64	60
Butt Weld, double extra strong, plain ends, card weight.		
½ in.	64	60
¾ to 1½ in.	67	63
2 to 3 in.	69	65
Lap Weld, double extra strong, plain ends, card weight.		
2 in.	65	61
2½ to 4 in.	67	63
4½ to 6 in.	66	62
7 to 8 in.	59	55



## THE IRON AND METAL MARKETS

the Pressed Steel Car Company 1000 60,000-lb. steel underframe box cars, also 200 all-steel 100,000-lb. box cars for hauling phosphate, and 30 cabooses, the latter to be built by the Western Steel Car & Foundry Company. The Chicago, Burlington & Quincy has ordered 500 refrigerator cars from the American Car & Foundry Company and is still in the market for 1000 general service gondolas. The Southern Railroad has bought 100 steel cars. The demand for plates from boiler shops and other consumers is light, and the mills are operating only to 60 per cent. of capacity or less. Some of the smaller plate mills are slightly shading 1.40c. on narrow plates. We quote  $\frac{1}{4}$ -in. and heavier plates at 1.40c., Pittsburgh.

**Sheets.**—The new demand for sheets and the specifications against contracts do not show any betterment, and the condition of the trade therefore remains unsatisfactory. An order for about 250 tons of corrugated iron sheets for the new buildings of the Gary Screw & Bolt Company at Gary, Ind., is pending, and will be placed in a few days. Prices are fairly well maintained, but in some sections, notably in the South and Southwest, there is some slight cutting on desirable business coming up. So far there has been no intimation that an official reduction in prices of sheets will be made, and it is not believed that such action would help the market in a buying way. Regular prices on black, galvanized and roofing sheets, which continue to be shaded to a slight extent in some sections, are printed on a previous page.

**Tin Plate.**—The tin plate trade is in fairly satisfactory condition. While the new demand is light, specifications from the can makers are being received in large volume, and shipments to this class of consumers over the next three months will be heavy. The American Sheet & Tin Plate Company is operating to a little more than 75 per cent. of capacity, and this week is running two of its leading tin plate plants to full capacity that for several weeks were running only four days a week. It is stated that prices are being well maintained. We quote 100-lb. coke plates for delivery over remainder of this year at \$3.70 per base box, f.o.b. Pittsburgh.

**Bars.**—The new demand and specifications against contracts for soft steel bars are very light. It is not believed that the consumption of steel bars by the agricultural implement makers this year will be as heavy as usual. The demand for hard steel bars for reinforcing purposes is fairly active. Iron bars are quiet both in new demand and in specifications against contracts. We quote soft steel bars at 1.40c. and common iron bars at 1.30c. to 1.35c., f.o.b. Pittsburgh.

**Shafting.**—A slightly better inquiry is noted so far this month as compared with the same period in April. The new demand is still confined to small lots, and specifications against contracts are only fair. Distributors of shafting are carrying as small stocks as possible in the fear that possibly a revision in prices may be made. Regular discounts on cold rolled shafting are 57 per cent. off in carloads and 52 per cent. in less than carloads delivered in base territory, but in some cases these discounts are shaded.

**Spelter.**—New inquiry is slightly better, and prices are a shade firmer. We note a sale of 150 tons of prime grades of Western spelter for delivery to a Youngstown interest on the basis of 5.20c., East St. Louis. We quote prime grades of Western at 5.20c. to 5.25c., East St. Louis, the rate to the Pittsburgh district being 12 $\frac{1}{2}$ c. per 100 lbs.

**Hoops and Bands.**—By an unfortunate typographical error the quotation on hoops in this report last week was 1.35c., but it should have been 1.45c. The new demand for both hoops and bands is light, and specifications against contracts are only fair. We quote steel hoops at 1.45c., and bands at 1.40c., the extras on the latter as per the steel bar card. It is said that on desirable orders these prices are sometimes shaded.

**Merchant Steel.**—New orders entered for shipment by the mills and specifications against contracts are only fair and are mostly in small lots to cover actual needs. In spite of the light new demand, prices are quite firmly held, but hardly enough new business is being placed to test the market. We quote the higher grades of merchant steels, f.o.b. Pittsburgh, as follows: Iron finished tire,  $\frac{1}{2} \times 1\frac{1}{2}$  in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes,

tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

**Rivets.**—The new demand is only for small lots to cover actual needs, and consumers are not specifying freely against their contracts. We quote structural rivets at 1.75c. to 1.80c., and boiler rivets 1.80c. to 1.85c., Pittsburgh.

**Wire Products.**—There is a little better feeling in the wire trade, the new demand being slightly more active, but still confined to carload and smaller lots. Jobbers and distributors of wire products are taking in only such quantities of material as are absolutely needed to cover present wants. We quote galvanized barb wire at \$2.10; painted, \$1.80; annealed fence wire, \$1.60; galvanized, \$1.90; wire nails, \$1.80, and cut nails, \$1.60, f.o.b. Pittsburgh, full freight to destination added.

**Spikes.**—No large inquiries are in the market from any of the leading roads, but two of the Western lines have sent in quite liberal specifications against contracts in the past two weeks. The best price of railroad spikes is \$1.60, Pittsburgh, with the usual extras for odd sizes.

**Merchant Pipe.**—Several leading operators in natural gas fields have a project under way to pipe natural gas from the West Virginia fields to Detroit, Mich. If this project goes through it will require from 225 to 250 miles of 20-in. pipe. The Southern California Gas Company, Los Angeles, Cal., is in the market for 90 miles of 10 to 12 in. Jobbers and small dealers continue to place only such orders for merchant pipe as are required to meet current needs. It is stated that discounts on iron and steel pipe, printed on a previous page, are being well maintained.

**Coke.**—A blast furnace interest is reported to have bought 5000 tons of standard grade furnace coke for May delivery at \$1.50 per net ton at oven. No large inquiries are in the market from blast furnace interests, but a number of important consumers of foundry coke, whose contracts expire on June 30, are now figuring on their needs for the last half of the year. The coke trade in general is dull, and prices are very low. We quote standard makes of furnace coke for May and June shipment at \$1.55 to \$1.60, and for delivery over the last half of the year at \$1.75 to \$1.85 per net ton at oven. Standard makes of furnace coke loaded on cars have sold for May shipment at \$1.50 per net ton at oven, while some other grades of furnace coke have sold as low as \$1.40. We quote standard makes of 72-hour foundry coke at \$1.85 to \$2 for spot shipment, and from \$2.10 to \$2.40 per net ton at oven for second half delivery. The output of coke in the Upper and Lower Connellsburg regions last week was 300,540 net tons, a decrease over the previous week of about 13,000 tons, being the lowest output in any one week for some months.

**Iron and Steel Scrap.**—Conditions in this trade seem to be getting steadily worse. The new demand is light and a good deal of scrap is pressing the market to find sale. We note sales of 500 tons of old car wheels at a price equal to about \$13.50 per gross ton, Pittsburgh; 500 tons of turnings at \$9, delivered; about 2000 tons of borings at \$8.75 delivered, and about 1000 tons of heavy steel scrap at \$12.50 to \$12.75, delivered. Dealers quote as follows, per gross ton, f.o.b. Pittsburgh, or elsewhere as noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery	\$12.50
No. 1 foundry cast	13.50 to \$13.75
No. 2 foundry cast	12.50 to 12.75
Bundled sheet scrap, at point of ship- ment	9.00 to 9.25
Rolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.	13.50 to 13.75
No. 1 railroad malleable stock	12.00
Grate bars	10.50 to 10.75
Low phosphorus melting stock	16.50 to 16.75
Iron car axles	24.25 to 24.50
Steel car axles	18.50 to 18.75
Locomotive axles	23.00
No. 1 busheling scrap	12.00 to 12.25
No. 2 busheling scrap	8.50 to 8.75
Old car wheels	13.50 to 13.75
Sheet bar crop ends	15.50 to 15.75
*Cast iron borings	8.60 to 8.75
*Machine shop turnings	9.00 to 9.15
Old iron rails	15.00 to 15.25
No. 1 wrought scrap	14.25 to 14.50
Heavy steel axle turnings	10.25
Stove plate	10.50 to 10.75

\* These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

**Boiler Tubes.**—A good many contracts from the large consumers for boiler tubes expire June 30, and it is expected that within the next three or four weeks

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Some of these will be in the market for their requirements for the last half of the year. The new demand for merchant tubes is only for small lots.

### Chicago

FISHER BUILDING, April 12, 1911.—(By Telegraph.)

No great change is noted in the condition of the Chicago market, although in a small way some Western railroads have been purchasers. Business on all lighter finished products seems to have fallen off. The one bright item in this week's report is cast iron pipe, the leading industry having closed a number of very desirable municipal lettings. The price of practically every item in the scrap list has fallen off, and, with some of the larger mills practically out of the market for this product, accumulations are rapidly increasing. A confusion of labor troubles is delaying the completion of many Chicago buildings, but so far structural iron workers have avoided the fray and such buildings as have been started are going forward nicely. The loop district of Chicago is undergoing a great transformation. At least a dozen of the old landmarks in this part of the city are being torn down by wrecking crews and will be replaced by larger buildings of modern construction.

**Pig Iron.**—Most pig iron business is being done in single carload lots. The number of such orders being received would indicate that foundries in this district are running close to the wind, with badly depleted stocks, but such is not the case, most orders being for special analysis iron which is evidently being used to tone up material already on hand. There seems to be a united opinion that more furnaces must go out of blast and pig iron production be held decidedly under consumption for some months before any marked improvement will result. Prices of Northern irons are reported to be somewhat shaded to secure desirable business, but the principal producers are firmly maintaining present prices. Lake Superior charcoal iron prices are known to have been shaded, the lower quotations being made for immediate delivery from large accumulations which must be moved. A Wisconsin foundry is reported to be in the market for its last half requirements of this nature. Prospective purchasers accompany practically every inquiry by the statement of what they are willing to pay, \$10.50 and \$10.75, Birmingham, for Southern No. 2 being prices commonly named in such a manner, but furnaces are adhering to \$11 for deliveries extending over the remainder of the year. The following quotations are for Chicago delivery, with the exception of Northern irons, which are now quoted, f.o.b. furnace:

Lake Superior charcoal.....	\$17.50
Northern coke foundry, No. 1.....	15.50
Northern coke foundry, No. 2.....	15.00
Northern coke foundry, No. 3.....	14.75
Northern Scotch, No. 1.....	16.00
Southern coke, No. 1 foundry and No. 1 soft.....	15.85
Southern coke, No. 2 foundry and No. 2 soft.....	15.35
Southern coke, No. 3.....	15.10
Southern coke, No. 4.....	14.85
Southern gray forge.....	14.60
Southern mottled.....	14.60
Malleable Bessemer.....	15.00
Standard Bessemer.....	17.40
Basic.....	15.85
Jackson Co. and Kentucky silvery, 6%.....	17.90
Jackson Co. and Kentucky silvery, 8%.....	18.90
Jackson Co. and Kentucky silvery, 10%.....	19.90

(By Mail.)

**Billets.**—The demand for billets is never very great in this market. It is only occasionally that a large sale is made. For several months the leading interest has steadfastly maintained its price at \$30.60 on open hearth forging billets. This price is commonly reported to be shaded by smaller competitors, but little trading is being done at any figure. We continue to quote \$30.60, base, Chicago, on open hearth forging billets and \$25.60, base, on rerolling billets.

**Plates.**—As long as Western car and ship building remain in their present inactive condition, little change is expected in plate business. The Indiana Steel Company's universal plate mill at Gary has been given a very satisfactory tryout and is now ready for operation as soon as the demand warrants. At the present time, however, the South Chicago mills are able to care for all the plate business in sight without trouble. Rumors of price cutting are common, but the principal producers are maintaining mill prices at 1.58c. to 1.63c. Store prices are 1.80c. to 1.90c., Chicago.

**Rails and Track Supplies.**—A little better business is noted on rails and track supplies. The leading interest has booked orders for about 7000 tons of standard sections, while the light rail and track supply business has been good. Specifications are coming in freely and practically every item shows a modest improvement. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.30½c., Chicago.

**Structural Material.**—This has been one of the quietest weeks on all sorts of structural material for many months. The total of the entire lettings for the week would not make one good contract. The Northwestern Railway is in the market for 8500 tons of bridge material. The contract for the postoffice at Bellingham, Wash., 220 tons, went to the Des Moines Bridge & Iron Works; the J. R. Watkins Medical Company's administration building, Winona, Minn., 190 tons, to the Modern Steel Structural Company; the Piru Creek bridge, Ventura County, Cal., 130 tons, to the Missouri Valley Bridge & Iron Company; the Y. M. C. A. building, Moline, Ill., 165 tons, to the Union Foundry Company, Chicago. We quote plain material from mill at 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

**Sheets.**—Small orders continue to prevail and buyers are showing no disposition to anticipate their wants. Mills are running at about 60 per cent. capacity, with a very small volume of business in sight. Producers are inclined to take a cheerful view of the situation, however, and consider business very fair under existing conditions. Small mills are probably making concessions in prices, as rumors to this effect are common, but the principal producers, whose sheets are best known, are firmly maintaining prices as follows: Carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

**Bars.**—Both steel and iron bar business has been far below normal for the first four months of the year. Merely a fair amount of business is coming forward for steel bars, with rumors of price concessions. Bar iron is decidedly weaker, and the quotations given this week represent a market that is strongly reported to be less, as prices have been rumored as low as 1.20c. or even 1.18c. These figures, however, are not verified. Regular prices, Chicago, are as follows: Soft steel bars, 1.58c.; bar iron, 1.22½c. to 1.27½c.; hard steel bars rolled from old rails, 1.30c. to 1.35c. From store, soft steel bars, 1.80c. to 1.90c., Chicago.

**Wire Products.**—The great rush of spring business is about over, and mills are now easily taking care of business as it comes in. Barb wire is the only item on which producers are making delayed shipments and these are not nearly as much held back as a few weeks ago. The spring months have brought out a remarkable amount of poultry netting business, the demand for this light fencing having increased steadily for some years. Many jobbers report their spring sales of poultry netting greater than in any similar period in their history. The sale of nails and fence wire has somewhat dropped off, and small local shipments are decidedly heavier in jobbing houses than are carload lots. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire No. 9 and coarser, base, 1.78c.; wire nails, 1.98c.; painted barb wire, 1.98c.; galvanized, 2.28c.; polished staples, 1.98c.; galvanized, 2.28c., all Chicago.

**Cast Iron Pipe.**—The cast iron pipe business in the Chicago market is decidedly better. This business has been good all the spring when other products were somewhat backward. The railroads are still somewhat backward about placing their orders, and considerable business of this nature is known to be pending. During the past week the leading interest has closed contracts with the following municipalities: Milwaukee, Wis., 4500 tons of water pipe; Kansas City, Mo., 1600 tons; Springfield, Ohio, 900 tons; Saginaw, Mich., 400 tons. Toledo, Ohio, has also been the purchaser of 1575 tons of high pressure pipe. A number of small orders have been drifting in from various gas companies, although most of the larger business of this nature has been closed. The prospects for an exceptionally

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good pipe season brighten as the year advances. Prices remain firm as follows, per net ton, Chicago: Water pipe, 4 in., \$25.50; 6 to 12 in., \$24.50; 16 in. and up, \$24, with \$1 extra for gas pipe.

**Old Material.**—The market has continued to settle, and its present unevenness is due to the lack of actual trading. Several railroad offerings have appeared during the week, prominent among which are 600 tons by the Soo Line, which closes May 12. The Chicago, Milwaukee & St. Paul came out with a list approximating 3500 tons, which closed May 8. The 30,000-ton accumulation of the Santa Fé closed on May 5, and although no sales were made the bids received give something of an idea of the market as follows: No. 1 busheling, \$8.80; No. 1 cast, \$10; steel knuckles and couplers, \$9; heavy melting, \$10.25; No. 1 wrought, \$11.15; long rails, re-rolling, \$13.25; short rails, \$11; bent and twisted, \$11; frogs, switches and guards, \$10.50. The record breaking accumulation in the scrap yards of this railroad company is being enlarged by the arrival of from one to ten cars of unassorted scrap every day. No two people vitally interested in the Chicago scrap market are holding the same opinion as to what the market really is. No. 1 busheling is an item upon which this diversity of opinion seems to have centered, but we are advised that the Milwaukee list, which closed to-day, brought \$9 on this item, f.o.b. connecting lines, which, with the bids on the Santa Fé list, pretty well establishes a price. Prices are for delivery to buyers' works, all freight and transfer charges paid, and are as follows, per gross ton:

Old iron rails.....	\$14.00 to \$14.50
Old steel rails, re-rolling.....	14.00 to 14.25*
Old steel rails, less than 3 ft.....	11.25 to 11.50
Relaying rails, standard sections, subject to inspection.....	22.00 to 23.00
Old car wheels.....	12.75 to 13.25
Heavy melting steel scrap.....	10.25 to 10.75
Frogs, switches and guards, cut apart.....	10.25 to 10.75
Shoveling steel.....	10.25 to 10.75
Steel axle turnings.....	8.50 to 9.00

The following quotations are per net ton:

Iron angles and splice bars.....	\$12.25 to \$12.75
Iron arch bars and transoms.....	13.50 to 14.00
Steel angle bars.....	10.50 to 11.00
Iron car axles.....	18.25 to 18.75
Steel car axles.....	17.25 to 17.75
No. 1 railroad wrought.....	10.75 to 11.25
No. 2 railroad wrought.....	9.75 to 10.25
Steel knuckles and couplers.....	9.75 to 10.25
Locomotive tires, smooth.....	16.50 to 17.00
Machine shop turnings.....	6.25 to 6.75
Cast and mixed borings.....	5.00 to 5.50
No. 1 busheling.....	9.00 to 9.50
No. 2 busheling.....	6.75 to 7.25
No. 1 boilers, cut to sheets and rings.....	7.50 to 8.00
Boiler punchings.....	11.50 to 12.00
No. 1 cast scrap.....	10.75 to 11.25
Stove plate and light cast scrap.....	9.25 to 9.75
Railroad malleable.....	10.50 to 11.00
Agricultural malleable.....	9.25 to 9.75
Pipes and flues.....	8.00 to 8.50

### Philadelphia

PHILADELPHIA, PA., May 9, 1911.

A few fair-sized sales of special grades of pig iron are reported, but the general demand still continues along very narrow lines. There is almost an entire absence of demand for foundry pig iron for forward delivery. In finished as well as semi-finished materials there has been little fresh business offered, and in some lines specifications are less numerous. A sharp falling off in the demand for steel billets is reported. Prices in practically all lines of finished materials are being firmly maintained by Eastern producers. The old material market is very quiet.

**Iron Ore.**—Consumers show no interest, awaiting further developments as to the pig iron situation. Some reports of deferred shipments are being heard. Importations in the week ended May 5 were confined to one cargo of 4900 tons of Cuban ore.

**Pig Iron.**—The movement in special grades has been more pronounced, with transactions in steelmaking grades of leading interest. A sale of 5000 tons of basic iron, to a consumer in the central part of the State, for second quarter shipment, at \$15.25, delivered, is reported, while one of the Eastern mills is testing the market in a small way for a block of the same grade, and another is negotiating for a considerable quantity. Low phosphorus iron is flatly on a \$21, delivered, basis in this district, several sales of moderate lots being reported at that figure. An interesting transaction is reported, involving the sale of about 1000 tons of Chinese basic iron, imported about four years ago, and which

has been held in storage since that time, which was disposed of to a cast iron pipe maker in this territory at private terms. This iron is subject to the old duty of \$4 a ton, and the buyer will use it in material for export, taking advantage of the drawback in the duty. The only transaction of importance in foundry grades was a sale of 1000 tons of No. 2 plain, for early shipment at \$15, delivered in this vicinity. This was a rather unusual transaction, as the buyer generally supplies all the iron required for its own use. The general demand for foundry grades has, if anything, been less active. The usual large lot buyers show no interest in the market and there is less inquiry for iron for forward delivery. The smaller buyers have also been purchasing less freely and the usual day to day sales have been in smaller number. For standard brands of eastern Pennsylvania No. 2 X foundry \$15.50 to \$15.75 represents the range of the market for second and third quarter deliveries. Reports of concessions, occasionally heard, usually develop the fact, on investigation, that the iron was somewhat off grade. The movement in Virginia foundry iron has been lighter. Prices are firm, but more extended deliveries can be had at quotations which recently applied strictly to second quarter deliveries. The cast iron pipe makers are still negotiating for low grade iron, but sellers refuse to meet their views regarding prices, and no important transactions have been reported. Little inquiry for forge iron comes from the rolling mills, and prices quoted are largely nominal. Meetings of the Eastern and Virginia Pig Iron associations, held in this city last week, brought out little of interest. In Virginia one furnace, Longdale, has gone out, while in the eastern Pennsylvania district Sheridan furnace has blown out and Carbon will go out the current week. While official statistics are refused, it is stated that those of the Eastern association show a slight decline in both orders and stocks on hand, while those of the Virginia association are practically unchanged. Quotations for standard brands of iron, delivered in buyers' yards in this district, show but minor changes, the following range being quoted for second and, in instances, third quarter deliveries:

Eastern Pennsylvania No. 2 X foundry.....	\$15.50 to \$15.75
Eastern Pennsylvania No. 2 plain.....	15.00 to 15.25
Virginia No. 2 X foundry.....	15.80 to 16.00
Virginia No. 2 plain.....	15.80 to 16.00
Gray forge.....	14.75 to 15.00
Basic.....	15.00 to 15.25
Standard low phosphorus.....	21.00

**Ferromanganese.**—A sale of a lot of 500 tons to a local consumer, for which negotiations have been under way for some time, has been made at \$36.60, Baltimore, delivery over the last half of the year. No new inquiry is reported in this district, although some little Western business has developed. Quotations still show considerable variance, but \$36.50 to \$37, Baltimore, about represents the range for either prompt or second half shipments.

**Billets.**—A marked falling off in the demand is reported. Even specifications have been lighter, and one of the Eastern mills has reduced its productive rate. Prices are maintained, makers contending that under existing conditions concessions would not attract business. Open hearth rolling billets are firm at \$25.40, and ordinary forging billets at \$30.40, delivered in this vicinity.

**Plates.**—Current orders are fairly numerous, but continue small individually, and the aggregate volume coming to the mills shows practically no change. Moderate specifications against orders for bridge and car plates are reported. Very little business of any size for immediate consumption is in sight. Eastern mills are maintaining prices firmly, the recent 1.55c. minimum being named for ordinary plates, delivered in this district.

**Structural Material.**—New business develops rather slowly, although fabricators are busy estimating on work already in hand. Probably the most important project in this territory now up for bids is the Riggs Hotel, Washington, D. C., for which about 1000 tons will be required. Several fair-sized propositions are believed to be near closing, including the new building for the Fire Association in this city, requiring about 900 tons. The demand for plain shapes, while orders are not large individually, aggregates a very fair total. Prices of plain shapes are unchanged at 1.55c., delivered in this vicinity; low prices, however, continue to be named for fabricated work.

**Sheets.**—A slightly better demand is reported, al-

**THE IRON AND METAL MARKETS**

though business continues of a day to day character. Some Eastern mills were operated at full capacity last week and have been fairly well engaged this week, but the volume of business on order books is light and mills are not very well fixed as to forward business. Prices show no change, the following range being quoted, Eastern makers' mills, for current prompt lot business: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

**Bars.**—Business continues extremely quiet. Consumers are waiting for assurances of the stability of prices before placing any orders in quantity, and while 1.25c. mill, or 1.32½c., delivered here, appears to be the minimum for the general run of business in refined iron bars, the opinion prevails that this price can be shaded if the specifications were desirable, although it is stated that some of the mills have turned down orders offered under that level. The demand for steel bars has been quiet, with specifications against contracts light.

**Coke.**—Transactions of any importance are scarce, the bulk of the business closed being for small prompt lots. Buyers are not willing to contract at prices asked when prompt coke can be had at material concessions. Prompt foundry coke ranges from \$1.90 to \$2 per net ton at oven, while for second half delivery \$2.20 to \$2.40 is quoted. Furnace coke for prompt shipment is available at \$1.50 to \$1.60, at oven, while forward deliveries are held at \$1.80 to \$2. The following range of prices, per net ton, is quoted for deliveries in this territory:

Connellsburg furnace coke.....	\$3.70 to \$4.05
Foundry coke.....	4.15 to 4.55
Mountain furnace coke.....	3.30 to 3.65
Foundry coke.....	3.75 to 4.15

**Old Material.**—There have been few purchases of any size by consumers, although occasional small transactions between dealers are reported, usually at prices higher than mills will pay, as they generally apply against contracts at higher prices on which deliveries must be made. Heavy melting steel has not been active; mills offer \$13, delivered, as a rule, but in exceptional cases higher prices will be paid for prime material. Rolling mills are practically out of the market. Sharp concessions would probably induce buying, but sellers refuse to dispose of any quantity of material at present prices. Railroads' lists, recently bid upon by both consumers and merchants, are still unclosed. The following range of prices about represents sellers' ideas of the market for deliveries in consumers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap.....	\$13.00 to \$13.25
Old steel rails, reroling.....	14.00 to 14.25*
Low phosphorus heavy melting steel scrap.....	17.25 to 17.75
Old steel axles.....	19.25 to 19.75*
Old iron axles.....	25.00 to 26.00*
Old iron rails.....	16.75 to 17.25
Old car wheels.....	13.00 to 13.50
No. 1 railroad wrought.....	15.00 to 15.50
Wrought iron pipe.....	12.75 to 13.25
No. 1 forge fire.....	10.50 to 11.00
No. 2 light iron.....	7.00 to 7.50*
Wrought turnings.....	8.25 to 8.75
Cast borings.....	7.75 to 8.25
Machinery cast.....	13.25 to 13.75
Railroad malleable.....	11.50 to 12.00
Grate bars, railroad.....	11.00 to 11.50
Stove plate.....	10.50 to 11.00

\*Nominal.

**Cincinnati**

CINCINNATI, OHIO, May 10, 1911.—(By Telegraph.)

**Pig Iron.**—There is not enough large inquiry to test the market for prices. A few small sales for prompt shipment of both Northern and Southern foundry have been made at figures slightly below the regular schedule. Buyers are covered for the first half, and in a number of instances have enough iron under contract to carry them into the third quarter, while it is generally conceded that the recent cut in Lake ore prices had already been discounted by the iron producers. Consumers, however, evidence a tendency to wait until it is definitely determined if this reduction will be reflected in iron quotations. The foundry melt is lighter, and the consumption of basic is not holding up to the usual standard. An inquiry for 3000 tons of basic is being figured on, but the business is expected to be taken by a furnace located near the consumer's plant. There is no demand for malleable, consequently it is difficult to obtain a correct quotation on it. Both mal-

leable and basic are obtainable in the Ironton district around \$14, with the probability that shipments could be extended through the last half at a small advance. There is considerable talk of further reduction in the output in both Southern and Northern iron, but nothing definite has yet been decided on in this direction. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry.....	\$14.75
Southern coke, No. 2 foundry.....	14.25
Southern coke, No. 3 foundry.....	13.75
Southern coke, No. 4 foundry.....	13.50
Southern coke, No. 1 soft.....	14.75
Southern coke, No. 2 soft.....	14.25
Southern gray forge.....	13.00
Ohio silvery, 8 per cent. silicon.....	17.70
Lake Superior coke, No. 1.....	15.70
Lake Superior coke, No. 2.....	15.20
Lake Superior coke, No. 3.....	14.70
Basic, Northern.....	\$15.20 to 15.45
Standard Southern car wheel.....	25.25
Lake Superior car wheel.....	19.50

(By Mail.)

**Coke.**—Probably due to a decrease in the melt with the foundries, foundry coke is moving slower and there is also a reported let-up in furnace coke shipments. New contracts are scarce and none calling for any large amount has been closed lately. There is still a weakness shown in spot shipment furnace coke, especially in the Connellsburg district, where a few 48-hour brands have been available around \$1.40 to \$1.45 per net ton at oven. In the Pocahontas and Wise County fields \$1.60 to \$1.75 is generally quoted and in all three fields the future shipment price ranges between \$1.70 to \$1.90 for the last half. For immediate delivery several small lots of foundry coke have been bought around \$1.90, but the average price is \$2 per net ton at oven, with an advance of 25c. to 30c. asked for future shipment.

**Finished Material.**—No improvement can be claimed, but there is certainly no decrease in the demand for steel bars and certain kinds of structural material. Business booked is for a limited amount. The principal encouraging feature to report is that specifications on contracts are very satisfactory, and there are orders in sight that only need a little more confidence in general business circles to get started. The mill price on steel bars, plates and structural material is 1.40c., and warehouse figures run from 1.90 to 2c. Reinforcing concrete bars are reported as being in better demand.

**Old Material.**—The quiet conditions previously reported continue to prevail and dealers do not claim to look for a better market for several months. Offerings are light and sales to foundries are stated to figure out less than for any corresponding period since 1908. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$11.50 to \$12.00
Cast borings, net ton.....	4.50 to 5.00
Steel turnings, net ton.....	5.75 to 6.25
No. 1 cast scrap, net ton.....	9.75 to 10.00
Burnt scrap, net ton.....	7.00 to 7.50
Old iron axles, net ton.....	16.50 to 17.00
Bundled sheet scrap, gross ton.....	7.50 to 8.50
Old iron rails, gross ton.....	13.50 to 14.00
Relaying rails, 50 lb. and up, gross ton.....	21.00 to 22.00
Old car wheels, gross ton.....	11.00 to 12.00
Heavy melting steel scrap, gross ton.....	10.00 to 10.50

**Cleveland**

CLEVELAND, OHIO, May 9, 1911.

**Iron Ore.**—There were between 20,000,000 and 21,000,000 tons of Lake Superior ore on docks and in furnace yards May 1 according to careful estimates based on the ore on hand a year ago, the 1910 shipments and the consumption during the year as shown by the pig iron production. On May 1, 1910, the amount of unconsumed ore on docks and in furnace yards was approximately 13,000,000 tons. The consumption during the year from May 1 to May 1 was about 35,000,000 tons. The ore on docks and at furnaces at the close of navigation December 1, 1910, was estimated at close to 32,000,000 tons. The amount on docks and in furnace yards May 1 was much larger than on the same date of any previous year. The ore market is very quiet, the only sales reported being in small lots. No inquiries for any round tonnages are pending. Ore shipments for April were 331,645 tons, as compared with 1,520,305 tons during April, 1910. A year ago the early movement was quite heavy. The shipments in May will be very light. We quote prices as follows: Old range Bessemer, \$4.50; Mesaba Besse-

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mer, \$4.25; Old range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

**Pig Iron.**—There is practically no demand for any grade. Foundries are deferring their purchases for the last half and producers see little indication of an early buying movement. The United Steel Company, Canton, Ohio, had not closed early this week on its inquiry for 3000 tons of basic. This inquiry is understood to have brought out quotations lower than have prevailed recently. Prices on foundry grades are stationary but quotations are largely nominal, there not having been any inquiries large enough to test the market since the reduction of ore prices. No. 2 foundry is quoted at \$13.75 to \$14, Cleveland and Valley furnace, for the second quarter, and it is believed that iron can be bought for the third quarter delivery at about the same prices. Southern foundry is held at \$11, Birmingham, for the second quarter and last half. For prompt shipment and the second quarter, we quote, delivered Cleveland, as follows:

Bessemer .....	\$15.90
Basic .....	14.25
Northern foundry, No. 1 .....	14.50
Northern foundry, No. 2 .....	14.25
Gray forge .....	13.50
Southern foundry, No. 2 .....	15.35
Jackson Co. silvery, 8 per cent. silicon .....	18.00

**Finished Iron and Steel.**—Mill agencies are booking a good volume of orders, but they are for very small lots so that the aggregate tonnage is light. Manufacturing plants as a rule are not getting a satisfactory volume of orders for their products and the only material they are buying is in small lots for their immediate requirements. Although the market is very firm on steel bars and structural material and the price of plates is being maintained as well as usual, there is a feeling among buyers that prices may go lower, and for that reason many are limiting their purchases to their early requirements. In structural lines specifications have been issued for the Central Y. M. C. A. building, Cleveland, requiring 1500 tons. Specifications will probably be out late this month for the new city hall building in Cleveland, requiring about 2000 tons. The McMyler-Interstate Company has been awarded the contract for the Dunham road bridge, Cleveland, 475 tons, and bids have been received for the Commercial building which will take 500 tons. The agricultural implement makers are doing nothing as yet regarding soft steel bar contracts, but some of them are reported to have closed for their hard steel bar requirements for the year running from July 1 at close to 1.25c., Pittsburgh. The demand for sheets continues moderate, the usual concession being about \$1 a ton. The sale of 300 tons of blue annealed sheets to an Erie, Pa., boiler manufacturer is reported. Prices on rivets are fairly steady, the maximum quotations being 1.80c., Pittsburgh, on structural rivets, and 1.90c. on boiler rivets. Mill agencies report a good demand for wire products. The demand for iron bars is light, and they are quoted at 1.30c. at mill.

**Old Material.**—The market is very dull. Prices are weak, but quotations are unchanged. Mills are not in need of much material and low prices are not tempting them to buy. About the only demand is for small lots of heavy steel scrap, for which consumers are offering \$11 to \$11.25. Little scrap is being offered by either dealers or producers at current prices. The Pennsylvania Railroad has received bids this week for a large tonnage. The Norfolk & Western Railroad has a list on which bids will be received May 17. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails, rerolling .....	\$13.00 to \$13.50
Old iron rails .....	15.00 to 15.50
Steel car axles .....	17.50 to 18.00
Heavy melting steel .....	11.00 to 11.50
Old car wheels .....	11.50 to 12.00
Relaying rails, 50 lb, and over .....	22.50 to 23.50
Agricultural malleable .....	11.00 to 11.50
Railroad malleable .....	11.75 to 12.25
Light bundled sheet scrap .....	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles .....	\$21.00 to \$21.50
Cast borings .....	6.00 to 6.25
Iron and steel turnings and drillings .....	6.25 to 6.50
Steel axle turnings .....	8.00 to 8.50
No. 1 busheling .....	9.50 to 10.00
No. 1 railroad wrought .....	11.50 to 12.00
No. 1 cast .....	11.25 to 11.50
Stove plate .....	10.25 to 10.50
Bundled tin scrap .....	11.00 to 11.50

**Coke.**—The market is very quiet, the only demand being for small lots of foundry grades for prompt

shipment. We quote standard Connellsville furnace coke for spot shipment at \$1.60 to \$1.65 per net ton at oven, and \$1.75 to \$2 for the last half. Connellsville 72-hr. foundry coke is held at \$1.95 to \$2 for spot shipment, and \$2.15 to \$2.50 for the last half.

### Buffalo

BUFFALO, N. Y., May 10, 1911.

**Pig Iron.**—Inquiry during the fore part of the week just past was light, but a change in the situation has taken place in the last two days and inquiry covering a comparatively large aggregate tonnage has developed, all being for foundry iron and including both early and forward deliveries. The total of these recent inquiries now under negotiation in this territory is about 15,000 tons, some of it being from large consumers—shipments on contracts have been fairly good and a little better than last week—the price situation remains about the same as for the previous week or two and at a schedule which is wholly unattractive to furnace operators. We quote as follows, f.o.b. Buffalo, for second and third quarter delivery:

No. 1 X foundry .....	\$14.25 to \$14.75
No. 2 X foundry .....	14.00 to 14.50
No. 2 plain .....	13.75 to 14.00
No. 2 foundry .....	13.50 to 13.75
Gray forge .....	13.25 to 13.50
Malleable .....	14.00 to 14.50
Basic .....	14.25 to 14.75
Charcoal .....	16.75 to 17.50

**Finished Iron and Steel.**—The week has been extremely quiet except in fabricated structural lines which have been fairly active. Selling conditions in general lines of finished products have been less favorable apparently than for a number of weeks and a less tonnage of bars and bar products has been placed than usual. Considerable tonnages of finished material, negotiations for which were pending last week, are still held in abeyance. The week has shown practically no new buying in tin plate and wire products, but specifications on contracts in tin plate are of fair volume. Wire nails are not moving as rapidly as anticipated when contracts were closed by the jobbers before the recent advances, and in some instances nails have been disposed of by jobbers at less than present mill prices. In fabricated structural material, specifications are out this week for figures for steel for the Klopp store and loft building, Main and Tupper streets, Buffalo, about 250 tons, and for the J. H. Smith building, Main and Genesee street, Buffalo, 150 tons. Steel specifications for the two Rosenbloom department store buildings, Syracuse, aggregating about 1000 tons, are also to be figured this week, and a small amount of steel for the substation postoffice building, at Main and East Utica streets, Buffalo. Bids are also soon to be received for steel for the St. Mary's hospital buildings and power plant at Niagara Falls, and for the Spirella Corset Company's factory buildings at the same place. Plans are being prepared for a 10-story Temperance Hotel at Rochester, about 1200 tons. Plans are about completed for grade crossing elimination viaducts over the New York Central, Erie, Lackawanna, Grand Trunk and International Bridge railroads at Amherst, Austin and Tonawanda streets, Buffalo, requiring approximately 5000 tons of steel, and upon which it is expected work will be commenced the latter part of the summer.

**Old Material.**—The scrap market continues dull and inactive, very little trading being done in any line; an occasional car load is the extent of transaction by most dealers who, as a rule, are simply filling in regular customer's short-stock requirements. No forward buying whatever is in evidence and no negotiations with the idea of filling future wants. Prices have been stationary for the past week and the following schedule is largely nominal, per gross ton, f.o.b. Buffalo:

Heavy melting steel .....	\$11.50 to \$12.00
Low phosphorus steel .....	14.00 to 14.50
No. 1 railroad wrought .....	13.25 to 13.50
No. 1 railroad and machinery cast scrap .....	12.75 to 13.25
Old steel axles .....	18.00 to 18.50
Old iron axles .....	22.00 to 22.50
Old car wheels .....	12.50 to 13.00
Railroad malleable .....	11.00 to 11.50
Boiler plate .....	9.50 to 10.00
Locomotive grate bars .....	10.00 to 10.25
Pipe .....	9.00 to 9.25
Wrought iron and soft steel turnings .....	6.25 to 6.75
Clean cast borings .....	6.00 to 6.25

**THE IRON AND METAL MARKETS****St. Louis**

ST. LOUIS, May 8, 1911.

While the demand for pig iron is quiet, consumption is continuing at a rather satisfactory rate, buyers taking out their iron according to contract. Some of the larger melters are well stocked, however, and consequently entirely indifferent as to the market. There is some increase in the demand for structural iron and steel. Finished metals are in light request.

**Pig Iron.**—The pig iron market continued along in its desultory manner, with but little inquiry and small purchases, most of which are for spot delivery. An inquiry for a sound lot of Northern and Southern iron for shipment over the last quarter, which had temporarily been withdrawn, was revived and closed up for the Northern. Negotiations are still on for the Southern iron. Outside of this, probably the total week's sales of pig iron will not aggregate over 750 tons. Prices are unchanged, though it is claimed that a concession of 25c. per ton is in some cases made for Southern iron for prompt shipment. We quote \$2 Southern foundry for shipment over the second half at \$11, Birmingham, for last quarter delivery only, \$11.50 is asked; No. 2 Northern foundry is firm at \$14 to \$14.50; Ironton, Ohio, either for shipment to July 1, or for last half. The same figures apply to malleable Bessemer for the same deliveries.

**Coke.**—The only large transaction in coke for the past week was the sale of 5000 tons of Stenega foundry for forward delivery. Quotations are \$2 to \$2.50 per net ton at oven for 72-hour selected Connellsville or Stenega foundry coke.

**Finished Iron and Steel.**—The tonnage of structural sales has been somewhat increased, and the demand has come from various portions of the local territory, which would indicate that sellers can look for better results. The Mississippi Glass Company let a contract for its building this week, requiring 250 tons of structural material, to the Stupp Brothers Bridge & Iron Company. Plates have been in fair demand. Agricultural implement and wagon concerns are still specifying for bars rather liberally; jobbers continue to do a fair business, but their orders for steel bars have been rather light, due to the lower price of iron bars. Light rails have been somewhat active, with an increased inquiry from the coal trade. Track fastenings have been moderately active. A new interurban road will be built shortly from Kansas City to St. Joseph, Mo., and from Kansas City to Excelsior Springs, Mo., which will need standard rails.

**Old Material.**—The Missouri Pacific is offering 2000 tons and the St. Louis & San Francisco about 1200 tons. The demand is light and prices are lower. We quote dealers' prices, per gross ton, f.o.b. St. Louis, as follows:

Old iron rails.....	\$12.50 to \$13.00
Old steel rails, rerolling.....	11.25 to 11.75
Old steel rails, less than 3 ft.....	10.25 to 10.75
Relaying rails, standard sections, subject to inspection.....	22.50 to 23.00
Old car wheels.....	12.00 to 12.50
Heavy melting steel scrap.....	10.25 to 10.75
Frogs, switches and guards, cut apart.....	10.25 to 10.75
The following quotations are per net ton:	
Iron fish plates.....	10.25 to 10.75
Iron car axles.....	16.50 to 17.00
Steel car axles.....	16.25 to 16.75
No. 1 railroad wrought.....	10.25 to 10.75
No. 2 railroad wrought.....	9.25 to 9.75
Railway springs.....	9.00 to 9.50
Locomotive tires, smooth.....	15.50 to 16.00
No. 1 dealer's forge.....	8.50 to 9.00
Mixed borings.....	4.00 to 4.50
No. 1 busheling.....	8.50 to 9.00
No. 1 boilers, cut to sheets and rings.....	7.25 to 7.75
No. 1 cast scrap.....	9.50 to 10.00
Stove plate and light cast scrap.....	8.00 to 8.50
Railroad malleable.....	8.00 to 8.50
Agricultural malleable.....	7.00 to 7.50
Pipes and flues.....	7.50 to 8.00
Railroad sheet and tank scrap.....	7.00 to 7.50
Railroad grate bars.....	7.50 to 8.00
Machine shop turnings.....	6.00 to 6.50

**Birmingham**

BIRMINGHAM, ALA., May 8, 1911.

**Pig Iron.**—The week has been devoid of interest so far as actual transactions were concerned. The tonnage sold was undoubtedly very light. Buyers are still unable, however, to break the \$11 schedule. The May

production promises to be less than April. Shipments for the first week have been very fair. Producers and dealers are hopeful that a real buying movement may begin by the end of the month. It appears certain that a number of different interests will have to come in the market before another month passes. Prices remain as follows, f.o.b. cars at furnaces in this district:

No. 1 foundry and No. 1 soft.....	\$11.50
No. 2 foundry and No. 2 soft.....	11.00
No. 3 foundry.....	10.50
No. 4 foundry.....	\$10.00 to 10.25
Gray forge.....	9.50 to 9.75
Standard basic, chill cast.....	11.00
"Off" basic.....	10.50
Charcoal car wheel iron.....	22.50

**Cast Iron Pipe.**—Some business came in the past week from the Pacific slope. All told, the week was a very satisfactory one to the pipe makers of this particular section. It is not anticipated that the melt will be increased during May, but the outlook is very good for a favorable showing as to shipments of the current make. Prices are held very firmly as follows, per net ton, on board cars here: 4 to 6 in., \$22.50; 8 to 12 in., \$22; over 12 in., average, \$21; with the usual differential of \$1 per ton higher for gas pipe.

**Old Material.**—A little better movement is reported in scrap. Dealers are on the lookout for such tonnages as are offered at any concessions in price, realizing that present prices are certainly rock-bottom. Some fair-sized shipments have been made recently, and the outlook is brighter in this line than for several weeks. This has been one of the dullest branches of the iron and steel business of the district, and dealers feel that the worst is over. Prices are as follows, per gross ton, on board cars here:

Old iron axes (light).....	\$14.50 to \$15.00
Old steel axes (light).....	13.50 to 14.00
Old iron rails.....	13.00 to 13.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	10.50 to 11.00
No. 1 country wrought.....	8.00 to 8.50
No. 2 country wrought.....	7.50 to 8.00
No. 1 machinery.....	10.50 to 11.00
No. 1 steel.....	9.50 to 10.00
Tram car wheels.....	9.00 to 9.50
Standard car wheels.....	10.50 to 11.00
Light cast and stove plate.....	8.00 to 8.50

**The German Iron Market**

BERLIN, April 27, 1911.

A weaker tendency in some products is mentioned in the reports from manufacturing centers. This applies in particular to bars, for which pressure to get orders is growing and offers to sell at 102 to 103 marks are now plentiful. Some of the larger makers, with orders for six weeks or two months ahead, are maintaining prices of 105 to 106 marks. On the other hand, a few cases are mentioned where bars were sold at less than 100 marks in the home market.

**A Good Report by the Steel Works Union.**

This week the most interesting news is the report of the Steel Works Union, which met yesterday for its regular monthly meeting. Its review of the situation is more optimistic than usual. The home trade in semimanufactured steel is described as keeping up to its former level, and the run of specifications is satisfactory. Sales for the September quarter were declared open at unchanged prices. The foreign market for this class of products has latterly grown somewhat more quiet, particularly in England, where the weakness of pig iron has checked the placing of orders. The calls for delivery on old orders are still of satisfactory volume. The Prussian railroad authorities have sent in orders for the supplementary amounts of rails, ties, and smaller steel supplies needed by the end of July. The foreign demand for heavy rails continues good, and further contracts for considerable quantities have recently been taken. Mills running on grooved rails have work till well into the autumn, both home and foreign orders having recently been taken in large amounts. Light rails for mines are being called for delivery on home and foreign orders at an active pace and the Prussian mines have recently placed orders for their yearly requirements. Orders for structural shapes have been of larger volume than a year ago and the revived activity in building operations warrants the expectation of rapid sales from now on.

The managers of several companies went to yesterday's meeting with applications in their pockets for raising their allotments in bars, plates, and tubing; but

# THE IRON AND METAL MARKETS

these increases were they withdrew their requests.  
**Efforts to Organize Pig Iron Makers.**

The attention of the market is still attracted in a lively manner by the negotiations for organizing the pig iron trade on a national basis. A meeting with the Siegerland furnaces was held by the Essen Syndicate managers last week, but it adjourned without tangible result. It is reported that the prospects of securing the accession of most of the furnaces of that region are regarded as considerably improved. Some four concerns, however, were not represented at last week's meeting, one of these being the Geisweider Works, a powerful concern with its own steel mill, which was chiefly responsible for the refusal of the Siegerland furnaces to join the Essen Syndicate at the time of its formation. Negotiations have also been commenced in an informal way with the furnaces of the Luxembourg-Lorraine district; and here, too, the prospects of reaching a satisfactory result are pronounced considerably better. The fact that so many of the big mixed establishments of the lower Rhine and Westphalian region are going into the Luxembourg-Lorraine district has not a little promoted the cause of the syndicate in the latter.

Trade in pig iron continues quiet, with few orders coming in. The Essen Syndicate, it is reported, has about 80 per cent. of its producing capacity for the rest of the year already under contract. The export demand for pig has latterly relaxed, supposedly in connection with the weaker situation in the United States.

This week the Coal Syndicate has reduced the make of coke; hitherto the mines had been turning out 75 per cent. of the coke allotments, but the Syndicate decided upon a restriction to 70 per cent. This action was doubtless taken in view of the accumulating stocks of coke, and not from any expectation of a reduced production of iron.

The news from the Belgian market is again unsatisfactory. A Brussels dispatch says that the price of basic pig at Charleroi has again been cut one franc; and that iron bars have been reduced 1.50 and 2 shillings for export. The bottom export price, free on board at Antwerp, is now 94 shillings.

The exports of some of the leading lines of iron and steel from Germany for the first quarter of the year compare as follows with the first quarter of 1910:

	Metric Tons.—	
	1911.	1910.
Pig iron.....	183,300	191,900
Steel billets.....	164,000	122,000
Beams.....	76,400	81,100
Bars, plain and shaped.....	176,100	127,500
Steel rails.....	129,600	88,100
Heavy plates.....	68,600	61,800
Wire and rods.....	92,500	94,400

At a recent meeting of the German machine-tool builders' society Dr. Junghann of Berlin read a paper on China as a possible market for German machinery, and in the course of his address he made some interesting remarks on the German and the American machine-tool industry. He admitted that the German tool builders received a powerful impulse from their American rivals prior to 1900; but that year, he said, proved the turning point in America's predominance in the world's markets. The German makers came forward with leaps and bounds and overtook the Americans. The time for imitating American models, he added, has passed away once for all; and German makers are now giving foreign builders as many ideas as they receive from abroad.

## New York

NEW YORK, May 10, 1911.

**Pig Iron.**—Sales have been for the most part in 200-ton to 300-ton lots and the aggregate is less than in the preceding week. Eastern Pennsylvania and New Jersey furnaces reduced stocks last month, but not enough to be significant. The situation in that territory is simply that enough furnaces have gone out to adjust production to a lessened consumption, and there will be a further slight curtailment in the Lehigh and Schuylkill valleys. One inquiry for upwards of 1500 tons is about to be closed. Prices are weaker to the extent that forward deliveries can be had at figures close to those for spot iron, and in some cases irons are being offered to foundries that have not used them at concessions from the prices asked for familiar brands. While little Southern iron has been coming into this market, the reported shading of the \$11, Birmingham, price for No. 2,

some transactions being reported at \$10.75, has had a weakening effect, together with the slackening of foundry operations, due in part to the machinists' strike. Buffalo irons are quoted at \$14 at furnace for No. 2, but \$13.75 can be done for early delivery and for part of the third quarter. We quote on Northern iron at tide-water as follows: No. 1 foundry, \$15.50 to \$16; No. 2 X, \$15.25 to \$15.50; No. 2 plain, \$15 to \$15.25. For Southern No. 1 foundry we quote \$15.50 to \$15.75; No. 2, \$15.25.

**Finished Iron and Steel.**—The week has been somewhat devoid of new inquiries of magnitude in finished iron and steel. The volume of business is still up to but no greater than the total of last year for the same period, but in one or two instances an attitude of confidence in the outlook was found. Prices are still maintained, but there is some weakness, at least hesitation, in Bar Iron and irregularities in fabricated material. Business in plates, especially for consumption in boiler shops, is dead owing to the machinists' strike. Of late awards the noteworthy are: 22,000 tons for the Woolworth 55-story building, New York, to the American Bridge Company; 6500 tons of plates, mostly 15 to 40 lb. per sq. ft., but ranging from 7.5 to 80 lb. per sq. ft., for the battleship New York, at Brooklyn Navy Yard, to the Worth Brothers Company; 3100 tons of shapes for this battleship may go to Carnegie Steel Company; 650 tons for a loft building at Wooster and Houston streets, New York, to the A. E. Norton Company; 500 tons for bridges, New York Central Railroad at the Gardenville Yards, to the Lackawanna Bridge Company, and 1400 tons for the building of the Southwestern Life Insurance Company, at Dallas, Tex., to the American Bridge Company. The Boston & Maine has taken bids for a 700-ton bridge; the American Smelting & Refining Company will erect a refinery at Baltimore requiring a hundred or more tons of steel involving relatively high labor cost for erection; about 100 tons of structural work is estimated for the Rockefeller residence at Pocantico Hills, N. Y., and an interesting concrete and steel structure is to be expected to replace the burned grandstand of the baseball field at the Polo Grounds, New York. Quotations are: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.40 to 1.45c., all New York. Plain material and plates from store, New York, 1.85c. to 1.95c.

**Cast Iron Pipe.**—The demand shows no improvement. The transactions of the past week have been few and the quantities involved small. The Perth Amboy letting advertised for May 3 has been postponed to May 23. No further public lettings of importance are announced in this locality. Carload lots of 6 in. continue to be quoted at \$21 to \$22 per net ton, tide-water.

**Old Material.**—The volume of business has shrunk to very small proportions. Few transactions are reported in any class of scrap, even cast scrap being neglected. Dealers continue to report rejections and the cancellation of orders taken at higher prices than those now prevailing. While conditions are exceedingly unsatisfactory, dealers' quotations are unchanged as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting.....	\$10.00 to \$10.50
Heavy melting steel scrap.....	10.00 to 10.50
Relaying rails.....	20.00 to 21.00
Standard hammered iron car axles.....	21.00 to 21.50
Old steel car axles.....	15.50 to 16.00
No. 1 railroad wrought.....	13.00 to 13.50
Wrought iron track scrap.....	12.00 to 12.50
No. 1 yard wrought, long.....	11.00 to 11.50
No. 1 yard wrought, short.....	10.00 to 10.50
Light iron.....	5.00 to 5.50
Cast borings.....	5.00 to 5.50
Wrought turnings.....	5.50 to 6.00
Wrought pipe.....	10.00 to 10.50
Old car wheels.....	11.50 to 12.00
No. 1 heavy cast, broken up.....	11.50 to 12.00
Stove plate.....	9.00 to 9.25
Locomotive grate bars.....	9.00 to 9.50
Malleable cast.....	10.00 to 10.50

## Metal Market

NEW YORK, May 10, 1911.

Cents Per Pound for Early Delivery.	Lead.						Spelter.
	Copper, New York.	Electro-	Tin,	New	St.	New	
	Lake.	lytic.	New York.	York.	Louis.	St. Louis.	
May.							
4.....	12.30	12.10	41.55	4.42½	4.27½	5.50	5.25
5.....	12.25	12.10	41.85	4.42½	4.27½	5.50	5.25
6.....	12.25	12.10	—	4.42½	4.27½	5.50	5.25
8.....	12.25	12.12½	42.25	4.40	4.25	5.50	5.25
9.....	12.25	12.12½	41.95	4.40	4.25	5.50	5.25
10.....	12.25	12.12½	41.50	4.40	4.25	5.50	5.25

Electrolytic copper is a little stronger, but Lake

**THE IRON AND METAL MARKETS**

is weak. Tin declined  $\frac{1}{2}$ c. per lb. during the week. Lead is off  $2\frac{1}{2}$  points from last week. Spelter is in better demand, but weak in price.

**Copper.**—The Copper Producers' report, issued May 8, showing April statistics, has given the market a better tone. All things considered, the report was much more favorable than was expected. The figures which are given elsewhere show a decrease in production and an increase in exports, but these favorable statistics are offset by the figures on domestic deliveries which show a decrease. It was pretty generally known, however, that April deliveries for domestic accounts were not heavy. Considering the general state of trade the report was good, and dealers are inclined to ask for better prices than they were demanding a week ago. A fair amount of copper was sold during the week, but no large transactions were noted and most of the sales of electrolytic were made on the basis of 12.25c., delivered in the Naugatuck Valley, 30 days cash. Lake was sold on the same terms at 12.37 $\frac{1}{2}$ c. Spot copper can now be had in New York at 12.12 $\frac{1}{2}$ c., while 12.25c. is asked for Lake. Casting copper is being offered at about 12.10c. The exports of copper so far this month have been good, amounting to 7704 tons. In London this morning the market opened rather weak with spot copper offered at £53 15s. and future at £54 6s. 3d. L. Vogelstein & Co. give the following figures of Germany's apparent consumption of foreign copper for the months of January-March: Imports, 42,004 tons; exports, 1898 tons; consumption, 40,106 tons, as compared with consumption during the same period in 1910 of 42,958 tons. Of the above quantity 36,232 tons was imported from the United States.

**Copper Averages.**—The Waterbury average for April was 12.50c. The average price of Lake copper in New York for the month was 12.40c., and the average price for electrolytic was 12.16c.

**Pig Tin.**—New inquiries are scarce, and although there is plenty of spot tin to be had consumers show no willingness to buy. This is, notwithstanding the fact that the market has declined  $\frac{1}{2}$ c. per lb. during the week. The market here is decidedly firmer than in London where quotations have declined sharply. This morning the London market opened with spot tin £3 cheaper than it was a week ago, the opening quotations being spot £190 10s. and futures, £187 10s. Two weeks ago futures were bringing the same price as spot. It was declared that the unfavorable condition of trade in the United States and the indifference of American buyers as to future prospects are having a depressing effect on the London market. The arrivals of tin in American ports so far this month are 1223 tons and there are 1215 tons afloat. Pig tin could be had in New York this morning at 41.50c.

**Tin Plates.**—The price of foreign tin plates at Swansea, Wales, has declined  $1\frac{1}{2}$ d. during the week and the quotation to-day was 13s. 9d. The demand for domestic tin plates is not strong, but quotations are unchanged at \$3.94 for 100-lb. coke plates.

**Lead.**—Independent sellers of lead reduced their quotations  $\frac{1}{2}\frac{1}{2}$  points on Monday, but it does not appear that any trading has been induced, as buyers continue indifferent. The St. Louis market is weak at 4.25c. and independent sellers here are asking 4.40c. The American Smelting & Refining Company continues to hold its price firm in New York at 4.50c., but in St. Louis it is meeting outside competition.

**Spelter.**—The galvanizing interests have been buying spelter in fairly good quantities and purchasers at present appear to have the best of the situation. Sellers show a great anxiety to get business, and prices are being cut right and left. Spelter can be bought in St. Louis at 5.25c., and it is being offered in this market for prompt shipment from the West at 5.40c. Spot spelter is scarce here, however, and it can not be had for immediate delivery under 5.50c.

**Antimony.**—Antimony is not as strong as it has been of late. Details of the syndicate operations continue to leak out and they show the position of the operators to be very strong. It has become known that the first secured control of the output of crude antimony on which several refiners in Europe depended and later persuaded the refiners that it would be to their disadvantage if they did not join the combination. One prominent European antimony producer did not go in the selling pool, and some refiners of Chinese grades are not in the movement. These producers, however, are taking advantage of the situation and are holding their prices very firmly. Cookson's is nominally 9.45c., and Hallett's can be bought at 9c. The market on

Hungarian grades is weaker at 8.15c. for spot, and 8.10c. for futures, while Chinese grades are offered at 8.15c. to 8.20c.

**Old Metals.**—Trade is quiet. Dealers' selling quotations are as follows:

	Cents.
Copper, heavy cut and crucible.....	11.75 to 12.00
Copper, heavy and wire.....	11.25 to 11.50
Copper, light and bottoms.....	10.50 to 10.75
Brass, heavy.....	7.75 to 8.00
Brass, light.....	6.50 to 6.75
Heavy machine composition.....	10.25 to 10.50
Composition turnings.....	8.50 to 8.75
Clean brass turnings.....	7.75 to 8.00
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.25 to 4.30

**Chicago**

May 9.—Trading has been very light the past week. Stocks are low, but there is no disposition on the part of buyers to build them up. Comparatively little business is being done in old metals and prices are weak. We quote Chicago prices as follows: Casting copper, 12 $\frac{1}{2}$ c.; lake, 12 $\frac{1}{2}$ c., in carloads, for prompt shipment; small lots,  $\frac{1}{4}$ c. to  $\frac{1}{2}$ c. higher; pig tin, carloads, 43c.; small lots, 45 $\frac{1}{4}$ c.; lead, desilvered, 4.40c. to 4.45c., for 50-ton lots; corralling, 4.60c. to 4.65c., for 50-ton lots; in carloads, 2 $\frac{1}{2}$ c., per 100 lb. higher; spelter, 5.35c. to 5.40c.; Cookson's antimony, 10 $\frac{1}{4}$ c., and other grades, 9c. to 10c., in small lots; sheet zinc is \$7.25, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12 $\frac{1}{2}$ c.; copper bottoms, 10 $\frac{1}{2}$ c.; copper clips, 12c.; red brass, 10 $\frac{1}{4}$ c.; yellow brass, 9c.; lead pipe, 4 $\frac{1}{2}$ c.; zinc, 4 $\frac{1}{4}$ c.; pewter, No. 1, 27c.; tin foil, 33c.; block tin pipe, 36c.

**St. Louis**

MAY 8.—Lead is unchanged at 4.50c.; spelter is steady at 5.55c.; both at East St. Louis. Zinc ore is stronger and held at \$36 to \$39 per ton, Joplin base. Tin is easier at 42.50c.; antimony (Cookson's), unchanged at 9.60c.; lake copper unchanged at 12.72 $\frac{1}{2}$ c.; electrolytic, unchanged, at 12.47 $\frac{1}{2}$ c.; all at St. Louis.

**Iron and Industrial Stocks**

NEW YORK, May 10, 1911.

While the general course of prices of stocks has been downward, notable exceptions have occurred, a sharp upward movement having taken place in the International Harvester and Can stocks. Transactions have been light, as general conditions have not been favorable for stock market activity. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week has been as follows:

Allis-Chalmers, com. 7 - 7%	Railway Spr., com. 32 $\frac{1}{2}$ - 33
Allis-Chalmers, pref. 27 - 29	Railway Spr., pref. .... 100%
Beth. Steel, com. .... 32 - 33	Republic, com. .... 30 $\frac{1}{2}$ - 32 $\frac{1}{2}$
Beth. Steel, pref. .... 60 $\frac{1}{2}$ - 62	Republic, pref. .... 93 $\frac{1}{4}$ - 95
Can, com. .... 10 $\frac{1}{4}$ - 12 $\frac{1}{2}$	Sloss, com. .... 49 $\frac{1}{2}$ - 50 $\frac{1}{2}$
Can, pref. .... 85 $\frac{1}{4}$ - 87 $\frac{1}{2}$	Pipe, com. .... 16 - 17
Car & Fdry., com. 53 - 53 $\frac{1}{2}$	U. S. Steel, com. .... 74 $\frac{1}{2}$ - 76 $\frac{1}{2}$
Car & Fdry., pref. .... 115 - 117	U. S. Steel, pr. .... 118 $\frac{1}{4}$ - 119 $\frac{1}{2}$
Steel Foundries.... 43 $\frac{1}{2}$ - 44 $\frac{1}{2}$	Westinghouse Elec. .... 68 - 69 $\frac{1}{2}$
Colorado Fuel.... 30 - 31	Am. Ship, com. .... 72
General Electric.... 155 $\frac{1}{4}$ - 158	Am. Ship, pref. .... 112
Gr. N. ore cert.... 60 - 61 $\frac{1}{2}$	Chi. Pneu. Tool.... 50 - 50 $\frac{1}{2}$
Int. Harv., com.... 119 $\frac{1}{2}$ - 129 $\frac{1}{2}$	Cambria Steel.... 45 $\frac{1}{4}$ - 46
Int. Harv., pref.... 124 - 128 $\frac{1}{2}$	Lake Sup. Corp.... 28 $\frac{1}{2}$ - 28 $\frac{1}{2}$
Int. Pump, com.... 40 - 41 $\frac{1}{2}$	Pa. Steel, pref.... 105 - 105 $\frac{1}{2}$
Int. Pump, pref.... 88 - 88 $\frac{1}{2}$	Warwick .... 10 $\frac{1}{2}$ - 10 $\frac{1}{2}$
Locomotive, com.... 37 - 38	Crucible Steel, com. .... 13 - 13 $\frac{1}{2}$
Nat. Enam. & Stamp, com. 16 $\frac{1}{2}$	Crucible Steel, pref. 80 $\frac{1}{2}$ - 81 $\frac{1}{2}$
Pittsburgh Steel, pref.... 104	Harb Walk Ref. .... 40 $\frac{1}{2}$
Pressed St., com. .... 32 $\frac{1}{2}$	Harb Walk Ref., pref. .... 96

**Dividends.**—The General Electric Company has declared the regular quarterly dividend of 2 per cent. payable July 15.

The American Shipbuilding Company has declared the regular quarterly dividend of 1 per cent. on the common stock, and the final installment of 1 per cent. of the 4 per cent. extra dividend declared last year, payable June 1.

The Niles-Bement-Pond Company has declared the regular quarterly dividends of 1 $\frac{1}{2}$  per cent. on the common and preferred stocks. The preferred dividend is payable May 15. The common dividend is payable June 20.

The Pratt & Whitney Company has declared the regular quarterly dividend of 1 $\frac{1}{2}$  per cent. on the preferred stock, payable May 20.

The Studebaker Corporation has declared the regular quarterly dividend of 1 $\frac{1}{4}$  per cent. on the preferred stock, payable June 1.

## Obituary

### Niels Poulsen

Niels Poulsen, president of the Hecla Iron Works, Brooklyn, N. Y., died May 3 at his home at Ft. Hamilton, in that city, aged 68 years. He was born in Denmark, and was educated in Copenhagen as an architect and builder. For two years after coming to this country in 1864, he worked as a mason, then as a draftsman in the office of the supervising architect in Washington, where he remained for two years. He then connected himself with the New York Architectural Iron Works, where he had charge of the architectural and engineering department.

Mr. Poulsen started in business for himself in 1876. Charles M. Eger, who had been a draftsman at the Architectural Iron Works, came to Mr. Poulsen in a similar capacity and was taken in as a partner, the firm name being Poulsen & Eger. In 1897 the firm was incorporated as the Hecla Iron Works, of which Mr. Poulsen was president and Mr. Eger vice-president. They established an evening school for the education of their employees, which proved a great success. The School of Mines, some few years ago, made a comparison between European and American iron work, and gave this concern full credit for establishing the present high class of work.

He was the originator of many improvements in construction, few of which were patented, as he preferred to make them public property. They include fireproof stairs, elevator inclosures, elevator cages, bookstacks for libraries, etc. He furnished to the government, free of charge, modes of construction for the Congressional Library in Washington which proved so successful that his methods were eventually universally adopted in large libraries. Mr. Poulsen often acted in the capacity of consulting engineer and architect in connection with public improvements.

Mr. Poulsen was a public-spirited citizen, taking much interest in questions concerning the welfare of the people. He offered a prize of \$50,000 to any one who would solve the Brooklyn Bridge congestion problem, but his offer was not taken up by any of the numerous engineers who have studied that interesting subject. He was interested in the public schools and gave many prizes for athletics and other means of improving the physical and mental condition of the pupils. He gave \$100,000 to the American Scandinavian Society, to be held in trust for educational purposes.

#### Mr. Poulsen and the Bower-Barff Process

George W. Maynard, 20 Nassau Street, New York, furnishes the following tribute to Mr. Poulsen:

"In 1881 George Bower read a paper before the Iron and Steel Institute, describing his method of rendering iron and steel rustless, and shortly thereafter Sidney Gilchrist Thomas wrote me about the results which were being obtained in England, at the same time urging me to take up the introduction of the Bower-Barff rustless iron process in the United States. The outcome of the tests of samples sent to me by Mr. Bower was my appointment as his representative in the United States, and the subsequent formation of the Bower-Barff Rustless Iron Company. Shortly after the formation of the company Mr. Winslow, of the firm of Poulsen & Eger, the owners of the Hecla Iron Works, called on me at the request of his firm for the purpose of obtaining a license for the use of the process. On the following day I went to the Hecla Iron Works and met Mr. Poulsen. The result of the meeting was the adoption of the process and the installation of the first Bower-Barff furnace in America. Mr. Poulsen quickly grasped the possibilities of the process in its application to artistic iron which would be exposed to the weather. At that time he had taken the contract to supply the iron work for the Produce Exchange in New York, which he agreed to furnish with the Bower-Barff finish without extra charge.

"The artistic iron work turned out by Poulsen & Eger was a revelation as to the use of iron for decorative purposes, and the elimination of the paint brush had much to do with the wide and still increasing use of iron. I was greatly impressed with Mr. Poulsen's liberality, in his willingness in permitting me to show the working of the furnace to those who desired to investigate the process with a view to its adoption. As a pioneer he would have

been fully justified in declining to admit competitors to his works; on the contrary, he gave me unreserved permission to show everything, and, furthermore, he treated hundreds of samples for parties who were contemplating the use of the process. Its adoption by competing manufacturers in its early stages was largely due to Mr. Poulsen's liberality. Our business relations rapidly grew into warm personal friendship, and it has continued for these thirty years. He was always a gentleman, and as far as I know was beloved by the men who worked for him. His success is an illustration of what can be accomplished in our land by honest work, ability, ingenuity and fair dealing."

Frank S. Jackman, general manager of the Verona, Pa., plant of the Standard Steel Car Company, died May 5, aged 57 years. He was born at Norwalk, Ohio. When a young man he entered the employ of the Illinois Steel Company, Chicago, and thence went to Carpentersville, Ill. He next became associated with his brother, Joseph Jackman, in the foundry business in Chicago. Later he went to Franklin, Pa., where he became superintendent of the Franklin Steel Casting Company. He resigned after a few years to become superintendent of the Pittsburgh Mfg. Company, leaving that concern to become superintendent of the Colonial Steel Company, Pittsburgh. About a year ago, when the plant of the General Castings Company, at Verona, was taken over by the Standard Steel Car Company, Mr. Jackman was made general manager.

Harry W. Bush, who was for 20 years connected with James A. Coe & Co., jobbers in iron and steel and machinists' supplies, Newark, N. J., and who for the last five years was secretary of the company, died May 5 at his home in Newark.

## Personal

Walter B. Snow, publicity engineer, 170 Summer street, Boston, Mass., has added to his staff John S. Nicholl, late of the New York Edison Company, and formerly acting manager for F. W. Horne, importer of American Machinery, Yokahama, Japan.

Hardy S. Ferguson, for many years chief engineer of the Great Northern Paper Company, is now established as an independent consulting engineer at 200 Fifth avenue, New York, and will devote himself to engineering work in connection with paper, pulp and fibre mills.

Wolcott Remington, well known as a designer and manufacturer of oil engines, has associated himself with the Blanchard Machine Company, Cambridge, Mass. He is now engaged in getting out a line of stationary and marine oil engines ranging from 10 to 100 h.p., which will be manufactured under the name of the Blanchard oil engine.

E. C. Green has again become associated with the Walpole Rubber Company, in the capacity of general purchasing agent of the consolidated companies, with headquarters at the factory office in Walpole, Mass.

C. W. Chappelle, chief engineer of the Electric Storage Battery Company, Cleveland, Ohio, addressed the Cleveland Engineering Society May 9 on "The Various Applications of Storage Batteries." At a special meeting of the society May 23 Claiborne Pirtle, vice-president of the Electric Controller & Mfg. Company, Cleveland, will present a paper on "Some Recent Improvements in Electric Motor Control."

A. B. Scully, president of the Scully Steel & Iron Company, Chicago, who has spent the last two months at his summer home at Santa Barbara, Cal., has returned to Chicago. He will leave shortly for a trip to Europe.

Gus F. Ziv, who for a number of years has been connected with the Crucible Steel Company of America in the Chicago office, is now connected with the Fitzsimons Steel & Iron Company, Chicago, which has recently accepted the Chicago agency of the Swedish Sisco Acorn tool and drill steels, and will carry a large stock at 218 to 224 North Jefferson street. In Mr. Ziv the Fitzsimons Company has secured a representative well known to the Western trade.

E. T. Mathewson, who for some time has been man-

ager of the machinery department of the Fairbanks Company, Philadelphia, Pa., has resigned, to take effect June 1, after which he will be connected with the White Company, Cleveland, Ohio, at its Philadelphia branch, in the sale of commercial trucks.

Percival Robert Moses, consulting engineer, 366 Fifth avenue, New York, has associated with him the following engineers as permanent additions to his staff: John Fallon, industrial engineer, recently mechanical engineer of the Tennessee Copper Company and Stanley G. Flagg & Company; Arthur V. Farr, textile engineer, formerly Szepesi & Farr; Alfonse Kaufman, formerly manager and chief engineer Alaska Chemical Company and associated with Charles B. Jacobs industrial laboratories; J. N. Walton, recently power engineer and storage battery expert, Brooklyn Edison Company. Mr. Moses announces that his office is prepared to handle complete industrial equipments.

F. A. Halsey has resigned as editor of the *American Machinist*. He will continue with the paper in a consulting capacity, with the title of editor emeritus. L. P. Alford succeeds him as editor of the paper.

F. S. Broadhurst, formerly in the employ of the C. H. Wheeler Mfg. Company, Philadelphia, and recently with the Westinghouse Machine Company, has rejoined the former company, assuming the position of sales manager, with his headquarters at the main office, Lehigh avenue and Eighteenth street, Philadelphia.

F. J. Mawby has resigned as machine tool salesman for the Vandyck-Churchill Company, and has joined the selling staff of the Peterson Engineering Company, manufacturer of power plant specialties, 50 Church street, New York.

James Morton, Jr., whose business address in this country is the Machinery Club, 50 Church street, New York, has returned from a selling trip around the world in the interests of several manufacturers of machinery and mill supplies.

W. M. White has become associated with the Allis-Chalmers Company, Milwaukee, Wis., as manager and chief engineer of the hydraulic turbine department. For the past five years he has had entire charge of the designing for the I. P. Morris Company, Philadelphia, Pa., in which position he has designed the hydraulic machinery for some of the largest installations in the country.

Edgar S. Cook, president of the Warwick Iron & Steel Company, Pottstown, Pa., returned from Europe last week.

C. A. Tupper, formerly manager of publicity for the Allis-Chalmers Company, has returned to his home in Milwaukee from a European trip of several months, which developed some interesting facts as to the continued demand for American metal-working machinery.

E. S. Mills, of the Carnegie Steel Company, Chicago, has returned from a trip to Europe.

W. B. Dickson, who recently resigned as vice-president of the United States Steel Corporation, also resigned as president of the Minnesota Steel Company, the subsidiary which is building steel works at Duluth. Chairman E. H. Gary has been elected president of the Minnesota company.

J. E. Rawson has been appointed northern Ohio sales agent of the Braeburn Steel Company, succeeding William F. Bonnell, resigned. New offices have been opened at 512 Cuyahoga Building, Cleveland, from which the business in Braeburn high-speed tool and other steels will be conducted. John E. Love, who covers the southern portion of Michigan, with headquarters in Detroit, will also hereafter be in charge of the Toledo district.

John F. Wallace, formerly chief engineer of the Panama Canal, who retired after inaugurating the American work on the canal and afterward the new Chicago & work on the canal and afterward designed the new Chicago & Northwestern passenger terminal at Chicago, which has just been completed at a cost of \$25,000,000, has assumed active charge as president of Westinghouse, Church, Kerr & Co., who were the engineers for the new Pennsylvania Station in New York.

H. Sanborn Smith has been elected a vice-president and the general sales agent of the Southern Iron & Steel Company, 24 Broad street, New York. C. C. Brown has been named assistant general sales agent. Mr. Smith was formerly general manager of sales of the Lackawanna Steel Company.

The Longdale Iron Company, Longdale, Va., on May 8 blew out the only furnace it had in blast.

The Warwick Iron & Steel Company, Pottstown, Pa., is now running its No. 1 furnace on low phosphorus iron. Repair work on the No. 2 furnace goes ahead steadily, and this stack may go in blast in July. Plans are also being made to repair the A furnace, so as to have it in shape, should the demand later in the year require its operation.

The returns of the American Railway Association put the number of idle freight cars on April 26 at 187,006, an increase of 1,953 in the preceding two weeks. The report of April 12 had shown a reduction of 9,834 idle cars from that of March 29, which in turn showed 12,374 fewer idle cars than on March 15, when the high point of the year was reached at 207,261 cars.

The Los Angeles Brass Mfg. Company and the Liebfried Brass Mfg. Company, both of Los Angeles, Cal., have been consolidated into one corporation to be known as the Los Angeles Brass Mfg. Company. The company manufacturers all kinds of brass goods and has a plant fully equipped for this line of work.

Edward C. Phelps, district sales agent for the Eastern Steel Company, has established his office in rooms 1310 and 1311, First National Bank Building, Cincinnati, Ohio. An error was made in the last issue of *The Iron Age* in stating that the office was in the Fourth National Bank Building.

## Trade Publications

**Spray Nozzles and Strainers.**—Buffalo Forge Company, Buffalo, N. Y. Booklet. Covers a line of spray nozzles for use in mines, steel and gas producer plants and other miscellaneous work. The construction of the nozzle, which is made in two parts, is shown, and a table of capacities is included. The Buffalo strainer, which is used for protecting plumbing fixtures, pumps and meters on water, steam or gas lines is also described.

**Adjustable Reamers.**—Gisholt Machine Company, Madison, Wis. and 50 Church street, New York City. Circular RC.—2. Concerned with the Gisholt solid adjustable high speed reamers which are made in the shell, taper shank and hand types, as well as in the shell and taper shank styles with a floating arbor for use on Gisholt turret lathes. All the various types of reamers are illustrated and tables giving the principal dimensions of each style are included.

**Metal and Wood Working Machinery.**—Badger State Machine Company, Janesville, Wis. Pamphlet. Size, 4 x 9 in.; pages, 48. Refers to an extensive line of metal and wood working machinery which includes punches, shears, combined punches and shears, leather and bench punches, bending rolls, saw tables and swinging cut-off saws. A page is devoted to each of the various machines and the general arrangement is a small half-tone engraving at the top with brief description and specifications occupying the remainder of the page.

**Pattern Shop and Foundry Supplies.**—The Cleveland Galvanizing Works Company, Cleveland, Ohio. Two bulletins. The first, C-11, illustrates the Samson and Cleveland galvanized pump chains. These are said to have double the life and greater strength than any other type of welded wire chain and will not kink. A variety of sizes ranging from No. 000 weighing 26 lb. per 100 feet to No. 1, weighing half as much, are made. The other bulletin, No. D-11, cancels No. D-9 and describes with numerous illustrations a complete line of supplies for pattern shops and foundries. An alphabetical index on the front cover of the bulletin shows exactly where the various lines can be found, and in addition to the illustrations in the body of the bulletin a complete price list is also given.

**Taps, Dies and Screw Plates.**—S. W. Card Mfg. Company, Mansfield, Mass. Catalogue No. 26. This catalogue supersedes all previous editions, and contains considerable data on taps of all kinds, hobs, reamers, screw plates, tap wrenches, dies and die stocks. The various types of threads are illustrated and a number of tables of useful information complete the catalogue.

**Shakers and Dumping Riddles.**—Hanna Engineering Works, 2059 Elston avenue, Chicago, Ill. Circular No. 36. Concerned with a line of shakers and dumping riddles for foundry use. The various types of shakers include tripod, trough and post shakers for both steam and air operation. A revolving dumping riddle operated by a direct connected  $\frac{1}{4}$ -hp. electric motor is also shown.

## Binders for Foundry Cores\*

### Results of Laboratory Investigations Intended to Give Greater Certainty in Core Room Operations

BY H. M. LANE

About two years ago the writer started a series of investigations to determine the effects of the various natural and artificial core binders when used separately and in combination. A number of foundry friends throughout the country tried experiments at the writer's suggestion and the results of these were brought together. It was nearly impossible to get some core makers to make desired mixtures, as they were almost sure to slip in more binder than was specified. It finally became evident that this problem would never be solved and the core room placed on the same scientific basis as now rules the melting platform until the work was undertaken and carried to completion in one laboratory with the co-operation of others throughout the country. The writer was about to give up the project when he was tendered the use of the laboratory of the Robeson Process Company, at its Covington, Va., plant. A very large number of samples of sand have been shipped there and many of the standard commercial binders have been obtained on the open market or from foundries. Some of the binder manufacturers have also co-operated by donating samples. The results of the investigations will be embodied in a paper to be read before one of the technical societies next fall. Thus far, however, many points of interest have been brought out which should be presented to the foundrymen at large, so that they may be discussed in the next few months and further information added to the store.

#### The Character of the Sand

We all know that a core must resist great heat, and hence the material of which it is composed must be of a refractory nature. Quartz sand seems to answer this purpose better than any other material; but even quartz itself varies in different parts of the world and the sand found contains many impurities. Fortunately, nature has provided what we may call concentrated or purified bodies of sand in different places, and the degree to which these have been purified or concentrated determines their values as core sands. Theoretically, the grains composing the sand should all be of silica, but they do not necessarily all have to be sharp. In fact, the writer's investigation has convinced him that for some classes of cores rounded quartz grains are better than angular, as they afford a better means of venting, on account of the fact that angular grains often pack more closely while in rounded grains there is always the same proportion of vent.

Sieve tests have shown that the most successful core sand is one having all the grains of approximately uniform size. If it is composed of coarse and fine sand graded down to dust the voids or spaces between the grains of the larger will be filled by the smaller particles and the vent destroyed.

#### Binders with Bonded Sands

Briefly speaking, all core sands are divided into two classes, namely, bonded and bondless, or sharp. Some of the best known examples of bonded sands in America are Mellville gravel and Pittsburgh loam. A natural bonded sand cannot be used with certain artificial binders, as the clay which forms the natural bond would neutralize or destroy the artificial bond. This is particularly true in cases where oil is used as the binder. Such binders as flour, pitch, rosin, dextrine and glutrin all work well with bonded sands, the proportion of bond determining to a large extent the action of the binder. Flour and dextrine together with pea meal and any similar starchy material belong to a class by themselves. The paste made with these binders unites with the clay and if the sand is thoroughly worked over to some extent accumulate at the

contact points, but more than half of the binder in all cases remains on the surface of the grains of sand in the vent spaces. The pasty material and clay remaining in the vent spaces decreases the vent by actually partially stopping the passages and by rendering the surface of the passages rough, so as to increase the friction which must be overcome by the rush of gas at the time of pouring.

Pitch and rosin (and under pitch should be included all the black compounds) bind in a different manner. All cores having starchy binders are hard as soon as they are baked, whether hot or cold. Cores having pitch or rosin binders if baked at ordinary temperatures are soft when hot, and only develop their maximum strength as the core cools after it is taken from the oven. The rosin or pitch is mixed with the sand mechanically, but when it melts it has a tendency to flow to the contact points. These binders, however, seem to require a certain percentage of clay in the mixture to develop their best qualities and are also best suited to relatively coarse sands, on account of the fact that the large percentage of clay usually present in these sands partly stop the vent passages.

Glutrin in a bonded sand seems to unite with the clay forming a homogeneous liquid that has a tendency to gather at the contact points, thus greatly strengthening them. Some of our experiments made by taking an absolutely bondless washed sand and adding bond have given surprising results in strength when glutrin was used as a binder.

Molasses has long been used as a foundry binder but the composition of molasses is uncertain, due first to variations in the amount of starch in the cane. Then, too, molasses is subject to fermentation, and this changes its adhesive powers. During baking molasses has a tendency to boil, and this may seriously deform the core. This binder is also very sensitive as to baking temperature.

#### Oil Binders for Bondless Sand

For bondless sand raw linseed oil is the best binder. As its price has been advanced through the demand in the paint trade, substitutes have come into the market. The commercial core oils are generally blends of these and other similar oils, with or without additions of rosin. In addition some core oils contain mineral oils either as a filler or spreader, or mineral oils with an asphaltic base which have binding value of their own.

The proper method of introducing a high grade core oil into the sand is to use some other material to increase the spreading value of the oil; in other words, to carry it over the sand. If the sand is mixed by hand fair results may be obtained by drying the sand, mixing the oil with it thoroughly, and then adding sufficient water to bring the whole to the proper consistency for ramming in the boxes. As the water is driven out as steam it distributes the oil thoroughly throughout the mass.

The strongest oil sand cores when considered from the basis of the amount of oil used are obtained by selecting a pure washed silica sand of comparatively uniform size of grain and then using raw linseed oil or one of its close neighbors as to strength. The best oil binders bind largely by the oxidation of the oil, just as a paint film dries by oxidation. The paint chemists have found that the addition of certain oxides to oil, among which are principally lead and manganese, hasten the drying of the oil. Applying to the core oven the principles governing in other industries using drying oils, we see that the old system of choking off the circulation and retaining the heat in the oven is not the proper method when drying oil sand cores.

#### Other Binders Than Oil

Cores in which the binder is pitch or rosin must have any contained moisture driven off as steam, and after that heat is all that is necessary to melt and distribute

\*Extracts from a paper read before the Newark, N. J., Foundrymen's Association, May 4, 1911.

the binder material. In the case of binders having a starch or gluten base, as flour or dextrine, the moisture must be driven off and heat applied sufficient to harden the compound. In this case the proper temperature is the same as that required to bake bread or biscuits; and after the moisture is driven off a circulation of air is not necessary. In fact, if the oven were too hot it would be deleterious, as it would tend to burn the binder.

Molasses and glutrin are binders which do not require a circulation of air beyond the driving off of the contained moisture. Glutrin is frequently used in oil sand mixtures and the blend has been found to give good results, the glutrin replacing from 60 to 75 per cent. of the oil. In this case the moisture must be driven out first, during which time the vents in the oven must be opened for circulation of air. By simply leaving the oven in this condition for the entire baking period there is sufficient circulation for the hardening of the oil.

In our experiments we found that with glutrin the best results were obtained with a slightly bonded sand, and working on this clue we took sharp sand and added to it about 1 per cent. of clay and glutrin at the rate of one part of glutrin to 75 parts of sand. Glutrin alone in sharp sand has a tendency to sweat to the surface of the core, making a hard exterior and a soft interior. A core of this type may be particularly well fitted for aluminum or some similar purpose, but is not what is wanted for general foundry practice.

As the writer has visited different foundries throughout the country he has learned that a number of foundrymen have discovered the value of clay when mixed with certain binders. In one foundry the sand was wet down with a mixture composed of clay wash and glutrin. In another dry fire-clay was ground into the sand and the entire mass wet down with glutrin and water. Clay wash and molasses have long been used in steel foundries. In other cases clay and flour were used together, while in one case a core was being made from a mixture of sand, Welch Mountain clay and sawdust, the sawdust being used entirely for the purpose of opening the sand and rendering the core rotten, so that it would crush before the metal. Sawdust may be introduced into many cores to advantage when a core that will crush is required.

#### Colloidal Conditions of Clay an Important Factor

In studying the question of clay as a binder the writer realized that the natural bond occurring in the sand was clay. Formerly the method of determining the bond in a sand for either core work or molding was to determine the alumina and figure it as the bond; but sands having the same relative amount of bond as determined by chemical analysis vary greatly when subjected to physical tests, hence the necessity of further research along this line.

Chemists have recently begun to recognize a class of bodies known as colloids. These are essentially gelatinous masses possessing the property of holding in combination a considerable amount of water. In the case of clay this colloidal condition seems to have been brought about mainly by the presence of organic matter in surface clays. Some of the fireclays found in the coal measures were evidently once filled with organic matter and rendered colloidal, and these when exposed to moisture have a tendency to take up the moisture that has been forced out of them by pressure and, as the clayworker expresses it, to "fatten."

The difference in the bonding power of clays appears to be a direct function of the difference in their colloidal matter; hence, if we could obtain some method of measuring the colloidal matter, we should have a means of comparing the natural bond in clays and sands. A number of methods have been proposed for this purpose, and we are now experimenting with them at Covington. The most successful thus far is the measurement of the colloidal material with an aniline dyestuff known as malachite green. These tests, however, are evidently going to be laboratory tests, and not foundry tests, as they require too careful manipulation for the ordinary foundry and the use of delicate laboratory apparatus. The writer's investigations has convinced him that within a short time we shall be able to point out methods by means of which the chemist can test the supplies for the core room and predict the results with certainty, just as to-day he controls the products used on the melting platform; and the progressive foundryman should look forward to this with

confident expectation, as it will enable him to overcome many of the difficulties now encountered.

It will, however, necessitate the placing of the core room under the supervision of more highly skilled men than has been the case in the past. At present, in order to make sure that the cores will stand up and also to overcome unexpected irregularities in the sand, foundrymen are commonly using from 2 to 10 times as much binder as is necessary, and in many cases are using a much more expensive binder than is necessary. One problem which we hope to solve in the investigation now under way is to be able to point out how to ascertain the cost of producing a given strength in a core; in other words, a rational method of comparing core sands.

#### Effect of Alkalies on Binders

One of the greatest surprises to us in this core-room investigation has been the effect of alkalies on the binders. While investigating a certain gangway sand we found that the cores were rotten on the inside and not very strong even on the surface, no matter what liquid binder was used. The microscope showed that the oil was destroyed and that glutrin tended to come to the surface and was also largely destroyed. After various experiments we tried adding acid to the sand, and this greatly increased the strength of the cores. A number of other sands had been giving weak cores with all of the liquid binders we had tried. An acid was tried on these, with the result that the strength of the cores was increased from 5 to 10 times. Both hydrochloric and sulphuric acids have been tried for this purpose, but sulphuric is best on account of the fact that the sulphates formed have no tendency to absorb moisture, while hydrochloric acid forms salts that tend to absorb moisture and hence soften the core. We are now working to determine the best methods of examining the sand to ascertain just the amount of acid to be used.

Along the line of the discoveries made as to the effect of alkalies on core binders the writer has learned of some interesting facts concerning the water used in tempering and mixing core sand. A certain foundry was purchasing city water and everything was going smoothly in the foundry and core department, but the expense of the city water was a considerable item, so they drilled an artesian well. The artesian water immediately caused trouble in the foundry. It is evident that it was highly alkaline and that this was neutralizing the effect of the binder either by saponifying the oil or by affecting the strength of other binders used. From this and other cases the writer believes that in the future it may be found just as advantageous to treat water for the core room as it is to treat it for the boiler room.

#### Binder Ratio with Dry and Damp Sands

Another surprise that came to us during the investigation was a discovery made when comparing binders with the use of a given standard sand. When dry sand was used several more cores were obtained from a given measured amount than from damp sand. An investigation showed that if dry sand were taken and measured and then tempered with about 4 per cent. of moisture its volume was greatly increased. If the tempered sand were poured into a measure and struck off, the volume in some cases was increased as much as 40 per cent.; and when poured in carelessly, so that it piled up loosely, with some large voids, the volume was increased even more than this. The explanation is simply that the dry sand packs together thoroughly, the grains sliding past one another into perfect contact.

When damp sand is dumped or poured into a receptacle the moment two moist grains touch, motion ceases, on account of the fact that they adhere and so the sand piles up with a much larger percentage of vent spaces. If the amount of moisture is increased until the sand flows it will pack as closely as when dry, or closer, because it is then entirely surrounded by water and the effect of the thin films of moisture on the surface of the sand is thus eliminated. This discovery explains some irregularities which had occurred earlier in our core experiments. It is evident, when a measured amount of dry sand is placed with a measured amount of binder, that owing to the fact that there are more grains of sand present the ratio between the sand and the binder will be higher than when moist sand is taken in the same measured amount, with a consequent smaller number of grains of sand. It

is possible with certain grades of sand and certain percentages of moisture measured in this way to introduce variations of at least 25 per cent. in the binding ratio.

For this reason, where accurate results are required all of the sand should be dried previous to mixing. This is also important in order to obtain the proper percentage of moisture in the core mixture, as we have found that this is an important item.

We have used the microscope to a considerable extent in examining sands and the manner in which binders act, and a little later the writer hopes to publish a series of micrographs illustrating these investigations.

#### Conclusions

To sum up, the action of core binders must be considered from the following points of view: The core must have sufficient strength to stand up before and during drying. This means the use of a green binder for some classes of work. Flour and dextrine and other gluten products form the best green binders; next to these come clay, glutin and molasses. Oil, rosin and pitch are all of little use as green binders, but the manufacturers of the black compounds frequently introduce dextrine or clay to serve as a green binder.

The most efficient final binder in the dry core would be one in which all of the binder would be gathered at the contact points of the sand so as to leave the vent passages free. Oil, or blends of oil and glutin, or glutin and clay seem to fill these requirements fairly well among the liquid binders, and rosin and pitch among the dry binding materials. But all of the dry binders have a greater or less tendency to roughen the surface of the sand in the vent passages and partly stop the vents. This is largely true on account of the fact that these binders are generally used with loamy sands or in conjunction with flour or dextrine.

#### The Victor-Balata & Textile Belting Company

On May 1 the new plant at Easton, Pa., for the manufacture of Victor-Balata belting in America was opened for active operations under the name of the Victor-Balata & Textile Belting Company. Victor-Balata belting has long been manufactured in Germany and imported into America by the New York Leather Belting Company. While this was satisfactory, as far as obtaining the great quality feature of the belting, there were delays due to importation, and it was finally decided to erect a plant in America. The new company is composed of German and American interests who have been connected in a business way in the balata belting line for a number of years. The German members of the company are the well-known belting manufacturers, C. Vollrath & Sohn, Blankenburg, Germany, with C. E. Aaron and J. R. Stine, of New York, Mr. Aaron being the president and Mr. Stine the secretary-treasurer of the New York Leather Belting Company.

The officers of the new company are as follows: C. E. Aaron, president; J. R. Stine, treasurer; Edwin Vollrath, secretary and manager of the new plant at Easton. Mr. Vollrath was brought up in the textile belting business, and especially in the balata end of it; therefore he is familiar with the making of Victor-Balata belting from beginning to end and is consequently especially fitted to handle the process in the new factory. In addition to having the entire services and supervision of Mr. Vollrath, who has taken up his residence at Easton, the new company has secured the services of the German foreman who lately arrived for the purpose of taking charge of the factory end of the business. The superintendent of the German company also came over for a few months to assist in successfully starting the new factory and to teach the American workmen all the details of the many processes entering into the making of this belting. The making of Victor-Balata belting in America has therefore been started under the most favorable circumstances, nothing having been left undone to maintain the same great quality in it that characterized the belting when imported.

The preliminary buildings are of steel and concrete construction, of the most substantial character, and the total amount of floor space utilized solely for the manufacturing purposes is about 30,000 sq. ft. Over 10 acres of land has been acquired, thus allowing ample room for additions in the future. The city of Easton extended the

city limits and a special private railroad siding has been put in communicating with the Lehigh Valley Railroad. The power plant is in a special building of its own. High pressure tube boilers, 200 h.p. each, of the E. Keeler Company make, and a Corliss engine made by the Hewes & Phillips Company have been installed and room has been left for additional units as needed. The auxiliary power machinery, such as pumps, heaters, condensers, etc., are of the most modern pattern throughout. The special machinery involved in the many processes of manufacture was imported from Germany where it was made under special specifications and under the direction of Mr. Vollrath personally. The entire plant has been laid out with the view of economical manufacture of textile belting in all the details, as the raw materials enter at one end and come out at the other end in the shape of finished rolls of belting ready for the trade.

For various reasons, relative both to the manufacture and marketing of Victor-Balata belting, the New York Leather Belting Company decided to separate entirely the textile belting business from that of the leather. While the new textile factory is at Easton, the sales end of the business will be handled from 51 Beekman street, New York, and from 172 North Franklin street, Chicago, the sales offices of the new company. The opening of the new plant at Easton, Pa., will consequently do away with all of the past delays due to importation of Victor-Balata belting and place the manufacturers in position to deliver all commercial widths and plies at short notice.

#### Carnegie Publications on Steel Mine Timbers

An unusually complete discussion of the use of steel in the underground operations of mine timbering, replete with the information needed to lay out the work, has been prepared for general distribution in two booklets published by the Carnegie Steel Company, Pittsburgh, Pa. One of these takes up not merely the one side of the question, but deals at length with the considerations of the use of wood, including that given preservative treatment, and of concrete. Considerable space is given to the variety of designs of steel work available for roof supports, gangway supports, underground pump houses and mine-shaft strengthening and lining, and detailed tables are included of the safe loads of beams and struts, of H and I sections, and of square and round oak, yellow pine, white pine, spruce and other beams and posts. The extended engineering treatment of the subject is convincing of the amount of study given to mine timbering, and the array of half-tone engravings is illuminating regarding the character and widespread adoption of this form of underground steel construction.

#### The Steel Corporation Buys the Rison Works

Representatives of the United States Steel Corporation closed last week for the Rison Iron & Locomotive Works property in San Francisco, for which negotiations have been under way for some time. The deed of transfer showed that Thomas Murray, acting for the American Steel & Wire Company, made the purchase. The price is put at \$2,100,000 and the purchasers assume a bonded indebtedness of \$600,000. The works at Potrero and 30 acres of land, which takes in a half mile of valuable water front, are included in the purchase. The report that the Steel Corporation has plans for continuing the operations heretofore carried on at this plant is incorrect; also the report that the corporation will build a blast furnace and steel works. The intention is to concentrate on the newly acquired property the warehouses and yards now maintained in San Francisco by the American Steel & Wire Company, the American Sheet & Tin Plate Company, the American Bridge Company and other subsidiary companies.

The Pressed Steel Car Company, Pittsburgh, Pa., is taking advantage of the present lull in the demand for steel cars by making some extensive improvements and additions to its plant at Woods Run, Pittsburgh. These include installation of some cranes and considerable new machinery. The plant will be put in first class shape in every way, and its capacity for the manufacture of steel cars will be slightly increased.



# The Betterment of Steel Works Labor Conditions

## Welfare Work Discussed at Judge Gary's Dinner of May 4—Some Comment on the Present Condition of Business

The improvement of labor conditions at iron and steel works occupied nearly all of the time devoted to speaking at the dinner given by Judge Gary to iron and steel manufacturers at the Waldorf Astoria, New York, Thursday evening, May 4. About 80 representatives of the industry were present. Preliminary to the dinner the American Iron and Steel Institute's new standing committee on Welfare Work had a session at which the work it has undertaken was discussed at length. A few days previous the special committee appointed by Judge Gary last year to secure as far as possible a six-day work week in the continuous operations of iron and steel manufacture had met to draft a report. Between this meeting and the date of the dinner all the members of the special committee had been appointed on the new standing committee and thus their report became in part a starting point for the after dinner discussion of Thursday evening. The occasion differed from the dinner meetings which had preceded in that there was scarcely more than a reference to the question of prices of iron and steel products.

In introducing the after dinner programme, Judge Gary referred to the pleasure the social meetings of the steel manufacturers had given him and to the abiding friendships which had resulted from such mingling together. This friendship he considered of more importance and of greater honor to any man than any honor or any satisfaction that could come as the result of mere business success. "To my mind," he said, "it is a most agreeable thing that you gentlemen, many of whom by education and practice and almost by birth many years ago were in business matters consummate enemies, are now the best of friends, representing in my opinion the very highest type of American citizenship. You who a few years ago would almost have been fighting one another, now if necessary would fight for one another. No one could attack any one of you without attacking all of you."

Following Judge Gary, remarks were made by eight members of the Institute who were called out by him. The first five of these were members of the Committee on Welfare Work: E. A. S. Clarke, president Lackawanna Steel Company; James A. Campbell, president Youngstown Sheet & Tube Company; F. W. Wood, president Maryland Steel Company; William B. Schiller, president National Tube Company; George G. Crawford, president Tennessee Coal, Iron & Railroad Company. Mr. Clarke was introduced as the chairman of the Welfare Work Committee but explained that he was in reality vice-chairman, as Judge Gary is *ex-officio* chairman of all the Institute committees. Following the remarks on welfare work President Farrell of the United States Steel Corporation was asked to speak on business conditions. He was followed by Joseph G. Butler, Jr., president Bessemer Pig Iron Association, and the last speaker was Willis L. King, vice president Jones & Laughlin Steel Company. Judge Gary then said a few words in conclusion. The remarks of the various speakers are reported quite fully below.

### Judge Gary's Remarks

Judge Gary spoke as follows on welfare work and the conditions affecting business in the United States:

One of the thoughts uppermost in my mind this evening relates to and grows out of the considerations of a committee of the American Iron and Steel Institute designated as the Welfare Committee, a regular standing committee, which is an enlargement of a special committee heretofore appointed to consider some of the subjects relating to the condition of our men at the mills. I think one of the most important questions which the American Iron and Steel Institute has to consider is the question of proper treatment of employees. It is not important to consider what the treatment of the employer by the employee is or may be. The man who has the intelligence and the success and the capital to employ labor has placed upon himself voluntarily a responsibility with reference to his men which he cannot escape and ought not to endeavor to escape. And I want to say to you, gentlemen, in my opinion one of the greatest questions for consideration by the capitalists of America today is the question of the treatment of their employees, so as to make it certain there will never in this country be any excuse for the

advancement of the ideas of the anarchist or the socialist. The American Iron and Steel Institute through the efforts of this general standing committee, has undertaken to do a work which in my opinion will be of the greatest benefit not only to the Institute itself but to the country at large.

### INTERNATIONAL CONFERENCE

Another question I wish to refer to briefly is the question of a proposed international meeting in Europe during the coming summer. At the time of the meeting of the Institute last autumn, when about 30 of the members of the fraternity who live in foreign countries were in this country, it was suggested that there should be an international meeting held somewhere in Europe. That meeting has been called for July 5 and 6 at Brussels, and delegates have been appointed, consisting of the directors of the Institute. Delegates have also been appointed by similar institutes or associations of perhaps all the iron and steel manufacturing countries of Europe. I believe it will be one of the noteworthy meetings of this century. It has been most remarkable to my mind that so much interest has been taken in the meeting by the prominent manufacturers of foreign countries, and I hope and believe it will result in some form of international organization, with the same fraternal feeling and the same association and the same disposition to get together for the purpose of consultation and of helping one another. I think the meeting will be the beginning of an epoch which you will all look back to with pride.

### THE CONDITION OF BUSINESS

One other subject I will briefly refer to is general business conditions. I think it would be a mistake for anyone to shut his eyes to the fact that in our lines and in business lines generally throughout this country conditions are not as good as we would like to have them. Business in January, February and March was very good, but the extra session of Congress had a very bad effect on business conditions throughout the country. It is a pity that an extra session of Congress seemed to be unavoidable and it is regrettable that politics should interfere with business progress. It is deplorable that so many politicians are mere politicians and not statesmen; that for political purposes action should be taken or proposed in the Congress of the United States which is to the great disadvantage of property and business success. Nevertheless it is a fact, we know by sad experience, that when Congress is in session there is a sudden and a marked hesitation, fear and doubt and distrust which enter the mind of the general business public. We have felt it very materially; others have felt it.

Gentlemen, I have presented the worst side of the case. Anyone can always see things in his business horizon which are not entirely satisfactory; anyone disposed to look down instead of up will find some feeling of discomfort. It is the hopeful man, the courageous man, the man who looks on the bright side, it is the man who realizes to the full extent the best things which appear to his view, who makes the greatest success. And there are

many things just now within our vision, if we have the disposition to see the best side, which are favorable and encouraging and should make us feel absolutely certain good times are ahead of us, and not so far ahead as to be out of sight or out of grasp. The fundamentals of the country were never better than they are today. Financial conditions were never before on as sound a basis in this country as they are today. Those of you who are connected with banks know that the trouble with the banker at the present time is that he has more money than he can profitably use. The circulation of money in this country per capita at the present time is almost 35 dollars—considerably larger than in other countries with very few exceptions. Moreover, the disposition of the people of this country at the present time is to have enacted into a law some provision similar if not entirely like the bill recommended by the Aldrich Committee. And if this shall become a law it is perfectly certain we will have no more financial panics in this country of great significance.

Then we have the one great thing which all of us look to eagerly every year, and that is the crop condition. Many of us have opportunities for ascertaining what the crop prospects are from time to time, and although no one can predict with certainty what will be the crop of any year, particularly until he sees the crops in the ground and nearly ripe, yet all the conditions which exist at the present time are evidence that we may expect, unless something unforeseen happens during the coming year, one of the best and largest crops we have ever had in this country.

#### THE WORK OF TROUBLE MAKERS

Then another thing is worthy of notice. There has been a disposition in this country during the last few years to throw stones at the business man; there has been a disposition to abuse, to criticise, to find fault, to attack. The demagogue has been more or less successful during the last few years and the people have been more or less deceived with respect to the conduct and the intention of the successful business man. It has been very popular for the man on the stump to say that because a business man is successful he is a dishonest man. And the people have been deceived. But you cannot deceive all the people all the time, as we know by experience and by the utterances of some of the great orators of the past. People are waking up; there is a reaction to some extent. The general mass of the people are coming around to the idea that the successful business man may be just as loyal to the country, just as honest in his dealings and just as friendly towards his competitors and his associates as the poor man, and that the successful business man is disposed to do as much as the statesman or the politician with respect to promoting the best interests of the people at large. And I tell you, gentlemen, the time is coming in the comparatively near future when we will see that the people have waked up to the fact there has been an imposition on the part of these demagogues, and that they have carried too far their attacks.

In saying this I do not mean to suggest for a moment that any of us should to any extent modify our view that we must do everything we possibly can every day, in season and out of season, to make it certain we are doing the right thing by everyone. And the disposition which we are showing among ourselves when we come together, in trying to help one another and to advance the interests of all others, we must also evidence in our treatment of everyone outside of our lines of activity, including our customers, including our employees, including all the makers and the administrators of the law, and including the public at large. We must put and keep ourselves on a platform so fair, so high, so reasonable, that we will attract the attention and invite and secure the approval of all who know what we are doing. In that way we will exercise an influence which should be of great benefit not only to ourselves but to all others. And let us focus all these thoughts and ideas which we advocate here, at the Iron and Steel Institute, making it the leader in these movements which are calculated to be of great benefit to all inside or outside, so that the Institute will be looked upon as something worthy and influential.

#### E. A. S. Clarke

Judge Gary has said that the question of the treatment of our employees and how we shall finally deal with that problem is of very great importance. It is very far reaching, as we look at it. We believe that the first thing

we all must do is, so to speak, to set our own house in order; to have our dealings with our employees and the conditions under which they work in our mills and factories such as are beyond reproach. We also realize that we have got to go further. We have to get at their manner of life when they go away from our factories; the conditions under which they are housed, the conditions of sanitation, of education, of relaxation, of amusement, their health and a great many other things. In view of these great problems there has grown up a new class of engineers, so to speak, those who call themselves sociological engineers. We believe that they have the right object in view; that what they are trying to accomplish is something we all want to accomplish; but we realize also that the problem is in many instances a special problem to each employer. Therefore the work we shall undertake primarily is to get together a statement of the problem, of how it is being solved in various branches of our industry elsewhere and to try to constitute this committee or the Institute a bureau of information, so that all those who are interested in the problem can find out what there is to do, what is being done and how it is being done, and in that way find a suggestion for the solution of each one of their individual problems.

The committee feels that it has tackled a very large problem; but it has a great deal of hope and courage, for it believes it is going to have the help, interest and entire co-operation of every member of the Iron and Steel Institute and of our industry. We have seen Judge Gary solve a problem which was as big and more difficult and harder to cope with; we have seen him bring it to a most successful conclusion and meet with the very greatest success in the face of conditions which to almost all of us, a few years ago, seemed to present obstacles almost impossible to overcome. And we believe, with his leadership and example, through this Institute, we are going to be the means of accomplishing another great reform, another great benefit for the industry.

#### James A. Campbell

We cannot expect that we are going to change entirely the present conditions, where they are not good, in a short time. You must not expect too much of this committee. We had our first meeting to-day and discussed this matter for two hours and over. The committee of the American Iron and Steel Institute will only be a sort of clearing house. The people in charge of the different plants must co-operate with us and put these plans in operation and do the work. You all know that the success of any business depends on its organization, and while you rely largely on your superintendents and your foremen in your different plants you also must rely on the men under them, and unless they are satisfied and contented and the conditions surrounding them are comfortable and congenial you are not going to get the high efficiency that we are talking so much about in the last few months. If you co-operate with us and do everything that you can to improve the conditions I think in a short time you will feel justified in having incurred any expense that you may have gone to; and, no matter whether you do or not, you owe this to your employees because your success is dependent entirely upon their co-operation and their work, and they cannot give you the best that is in them unless you give them good, sanitary working conditions. Those of you who furnish them houses to live in will have to make them as comfortable as possible.

A great many men treat labor organizations without any great consideration and try to get rid of them in order to take advantage of their men. You will find always when that is done they are continuously in trouble. The way to keep out of trouble with your employees, in my opinion, is to treat them fairly and not try to take advantage of them, either by reducing their wages when they cannot afford to have them reduced or making the working conditions so hard that they are unable to bear them.

I never have known a time when mills were running to only 50 or 60 per cent of their capacity, and when there has been so much unemployed labor as there has been recently, that the wages have not been reduced. I think we can all thank Judge Gary for the policy that he has pursued. I remember when this condition first came upon us, during the panic, that at the meeting held he insisted that the wages be not reduced. There were some of us

who felt that employees ought to stand their share if we were reducing prices, but there were others who felt that the cost of living at that time was too high to justify us in interfering with the wages of the workingmen. I think the wisdom of Judge Gary's attitude in that matter has been vindicated by the results; if we had reduced the wages we would have simply given that away to our customers; there would have been no greater profits for us and there would have been a great hardship to our employees who are getting to-day, I think, the highest wages that they ever have been paid in the history of this country, at least since I have been in the trade; and it is a remarkable situation.

Now if that was fair and right, which I think all of us will now agree, that it was for our benefit as well as for the benefit of our employees, we ought to go still further and give them all the comforts, surround them with the best working conditions that we can provide, and I hope that you will all co-operate with this committee because they will be obliged to ask you for information.

#### F. W. Wood

I feel that the functions of this committee are extremely important, and if the opportunities are fully improved its work will prove not only of great benefit to the trade but also be most valuable to this organization. I am very glad to hear Judge Gary make the suggestion that in considering the various steps that may be taken to improve the condition of our employees we should not be governed to too great an extent by the manner in which the efforts may be received at first. I think all of us feel that attempts to change conditions which are openly and distinctly in the direction of betterment are looked upon with suspicion by a great many of the employees. I do not think we should be influenced by that at all. It is not going to be possible for this Committee to do more than make suggestions, gather information, and perhaps lay down some general principles. We shall have to ask for the help of all members of the association and for suggestions from them. The agitation of this subject must be productive of good in the same way that the prominent discussion in recent years of conservation and increased efficiency in management is going to be productive of good. While perhaps some have gone to extremes and made statements that seem Utopian or incapable of accomplishment, still it has set the community thinking, and we see evidences in the press and in various ways of the new lines of thought that are opened up, and it is tending in the right direction. Now I conceive that in the same way this movement will result in the systematic building up of the material and social welfare of the employees of a great industry like the iron and steel industry.

#### William B. Schiller

The committee appointed last autumn by the American Iron and Steel Institute to consider the question of the six-day week in continuous operations has been at work on the subject for a good while and has carried on a very voluminous correspondence with a large number of those whose manufacturing operations involve the employment of labor seven days in the week. A number of different plans have been submitted. Finally a plan was evolved that seemed to meet the approval of a majority of those with whom the Committee communicated. Upon ascertaining that fact the Committee made its report to the directors of the American Iron and Steel Institute, at a recent meeting, and the directors passed a resolution instructing the committee to supply the Secretary of the Institute with copies of the plan, for distribution to such members as were engaged in manufacturing operations involving continuous employment. This will be done in the near future. I shall ask each member who is communicated with to express a willingness to make a trial. Any plan that is devised on paper is subject of course to more or less improvement upon actual trial. The Committee hopes that a really earnest effort will be made to put this plan, with such modifications as may be necessary to suit local conditions, into effect for a certain period and try it out. Pick all the holes in the plan that you want to; you will not hurt the feelings of the committee at all if you criticize it. It is not submitted as the last word at all, but in the hope that from it or through it may be evolved a practicable working plan that will abolish the seven-day week and abolish the long turn of 18 or

24 hours in changing from the day turn to the night turn.

The plan provides for what are termed relief men to take the places of men who are off duty, one day out of seven. These relief men are to be changed from one position to another. The suggestion has been made that, instead of doing that, when a man is off duty the man next below in position should be moved up. I think perhaps that is a better arrangement than the one outlined in the plan which will be sent to you. Other objections have been raised to this effect: That under the present system a foreman has a regular gang of men working under him, he is familiar with those men and the men are familiar with him—he knows what to expect of them; and it has been urged that to change that gang and introduce new men would impair its efficiency. I think that criticism is at least open to argument. At I view it, the changing of men from one position to another would in time make for greater efficiency of the whole force. A man who is working in a subordinate position and who is moved up into a position of greater importance and familiarizes himself with the duties of that position, naturally, in the course of time, becomes the more efficient workman, so I do not believe that criticism is well founded.

Another criticism is that the men themselves will object seriously to the loss of one day's compensation. That is to be expected. Every workman desires to earn just as much as he can; we all do. But again that does not seem to me to be a very sound position. In all other branches of our business we have men who work six days in the week and are paid for six days in the week. The wages of blast furnacemen particularly—and they are the ones most employed in continuous operation—are predicated upon what are termed common labor rates. The advances are paid above the common labor rates, depending upon the importance of the position; but nearly all are based upon common labor rates. That is true of a great many men in all other branches of the industry—common labor rates are the basis of all the other rates, except tonnage rates. Now, those men for all time have worked six days in the week and have been paid for six days in the week. If they, earning no more money than the men employed at the blast furnaces, per diem, are able to work six days a week, to be paid for six days and make a living on six days, surely the blast furnacemen can. It may be found advisable, after trial, to make some adjustment in the blast furnace labor. I rather question it; but at all events it is well worthy of a sincere, hearty and earnest trial.

#### George G. Crawford

The scope of the work can be so large that it is going to be necessary to limit the scope at the start, and, as Mr. Wood expressed it, hit the high spots first. One of the high spots seems to be to arouse interest among members of the association in carrying on welfare work. I know that among some operating men there is a certain prejudice against it because they think it is sentimental, and the question of sentiment is a good one in its place. But I think it will be a comparatively easy matter to convince men of that tendency of thought that there is a practical application which can be made of welfare work which will make it easier for them to get their work done by having more efficient men to help them to do it.

Two divisions of the work were slightly indicated, and importance was given to plant conditions; and those suggestions were made by members of the committee who had plants where the operatives live in fairly large communities, where the communities themselves provide opportunities for amusement, and where they have municipal organizations that are supposed to look after hygiene and sanitary measures in the houses and yards. But there are some companies represented in the American Iron and Steel Institute, and particularly the mining companies, where the camps are entirely owned by the companies, and there the operatives are entirely dependent on what the management does for their sanitary and hygienic surroundings and their pleasures outside of work hours. And it seems to me that in those cases we are peculiarly under a moral responsibility to our employees.

#### James A. Farrell

While I do not wish to digress from the subject assigned to me, which relates to trade conditions, I would like to tell of a conversation which took place the other day between two gentlemen. One of them claimed that he was a philosopher, and the other asked him upon what grounds

he made that claim. "Well," he said, "I am the owner of two lime kilns. I actually own both of them, but I am only supposed to be the owner of one. I think I have gradually acquired a philosophical temperament, because it is part of my daily pastime to read a large correspondence from the customers of the lime kiln which people suppose I do not own, claiming that the proprietor of that lime kiln is continually cutting my prices."

There is a great deal in that story. There is a growing element to-day in the business world who can be believed on almost any other subject but the question of prices—competitors' prices especially.

Now, with regard to trade conditions, it has been evident to most of us for some time, perhaps for the best part of the year past, that a great deal of expansion is taking place in the steel industry in this country. Some months ago it was estimated that the productive capacity of this country in 1911 was fully 3,000,000 tons, in the shape of steel ingots, in excess of the consumptive requirements. If that is so, and statistics would seem to support the claim, it should not be difficult to appreciate that none of us can force a 100 per cent. capacity into a 60 per cent. consumptive demand. That is another form of commercial philosophy. If we realize that condition and can reconcile ourselves to its acceptance, we are going to lead a very comfortable existence in the steel business in 1911.

#### PRICES AND DEMAND.

A great deal is said about the present range of prices. Of course, those of us in the steel business are aware that prices to-day are from \$5 to \$6 per ton lower than when the readjustment was made in 1909. I do not believe that any business can be forced by any change of prices. Furthermore, I am firmly convinced that in the anaesthetic condition into which business has fallen since April 4—and it is likely to continue until Congress adjourns—it cannot be revived by any change in the policy which we have been carrying out for many months. There is no doubt whatever that the business is in the country—it has simply been interrupted. That was demonstrated in the months of January, February and March. I think, without exception, every manufacturer here felt a gradual impetus to his business during the months of January, February and March particularly. As soon as the extra session of Congress convened, business began to fall off. I think to some extent it was greatly assisted by pessimistic statements which were not altogether warranted, as to the condition of the business, but which a great many gentlemen of the press felt it was necessary to discount in order that they might perhaps be right, if conditions should happen to grow poorer.

Now, you have noticed that during the first three months of this year something over \$300,000,000 has gone into bonds and note issues of railroads and some industrial companies; but largely the railroads have derived that amount of money from the sale of bonds and note issues. I think that during the past week or ten days we have seen some evidences of the existence of that money in the hands of the railroads. The railroad buying has been better during the last week or ten days, and a great many railroads that felt that they would not require any material in 1911 have suddenly discovered that they require rails or accessories or fences or tools or sheets, or something of that character.

Mr. Buffington showed me a telegram yesterday which was an order from a railroad that had been forgotten—as far as purchasing was concerned it had been forgotten that the railroad was in existence. Now, I believe that we will hear other voices from the tomb, the cemetery being large enough. The main thing for us to possess at the present time is a little patience and submission to conditions as we find them.

#### THIS COUNTRY THE ONLY LAGGARD.

The United States is the only country that I know of which is in the position it is in to-day. Practically every country on the face of the globe is enjoying a business far in excess of anything in its history. Take Canada: its prosperity to-day is beyond the dreams of even Sir Wilfred Laurier, who has claimed that the 20th century belonged to Canada, the 19th century having been conceded to belong to the United States. Mr. Drummond, the president of the Algoma Steel Company, told me yesterday that they could not possibly accept another order in 1911. The same thing is true of every iron and steel mill in Canada.

A great deal is being said about the revolution in Mexico; but notwithstanding the conditions that exist there business appears to be going on in Mexico, and during the past week or two has increased rather than decreased.

The Board of Trade returns for Great Britain show that the foreign trade of Great Britain in 1910 was over one hundred millions sterling—\$500,000,000 more than for any year in the past ten years.

A gentleman engaged in the steel industry in Germany told me within the week that Germany had produced 13,000,000 tons of steel in 1910 and exported 6,000,000 tons. That reminds me that Germany is a great country, and also reminds me that on the 8th day of last December I attended a meeting of the German Iron and Steel Institute at Dusseldorf, at which 800 members were present. The principal address was made by the Finance Minister of Germany, Dr. Renheisen. The substance of his address was that it would be one of the greatest industrial calamities to Germany if anything happened to prevent the prolongation of the German Steel Syndicate. Well, I almost had to pinch myself to find out where I was. In Germany not any particular attention was paid to it, though I rather imagine there would be some small consternation here if such a statement were made by one of the Cabinet officers of this country.

Notwithstanding, it all goes to show that in practically every country but ours the government, as well as the people, is engaged in building up commerce, while most of our time is spent in defending it. Nevertheless, as Judge Gary has said, we fully believe that the time is not far distant when we shall probably witness a change in sentiment.

#### THE OUTLOOK.

With respect to the future, I cannot prophesy; but I am thoroughly convinced that, with the conditions existing in this country to-day in the matter of crops and everything that helps business, within a comparatively short time we shall all be busy and have plenty to do. In the meantime it is going to require patience. We have got to sacrifice our order book unless we want to precipitate a condition of affairs which, as Mr. Schwab says [in a cablegram to Judge Gary], means an era of low prices and perhaps a continued situation in that line. If we have patience I am satisfied within a very short time we are going to be very well pleased with the trade conditions in this country, although we should bear in mind that even a boom in this country to-day would not absorb the existing capacity of the country. If any man feels he can operate his plants at 100 per cent., or 80 per cent., and seeks to do it on a consumptive demand that is in a lesser ratio, he is simply contributing to an undesirable thing. We do not feel that way in the Steel Corporation. We believe in fair competition—in live and let live methods. All we are expecting is our fair share of the business, and we are prepared now, as we have been in the past, to make as many sacrifices as anybody else when it comes to keeping within what we consider to be our range or our share of that business.

Joseph G. Butler, Jr.

I think that perhaps with some pride I may say we have done in Youngstown, in proportion to the population, as much if not more than any other community in the matter of helping our employees. Something over a year ago I was instrumental in organizing the Modern Homes Company. I succeeded in interesting a number of people in Youngstown, some of them in the iron and steel business and many of them not. The concern was organized with a capital of \$200,000, and we got at the head of it the president of our First National Bank, Henry M. Garlick, a man who inspires confidence in everything that he undertakes. The capital was very quickly subscribed, a competent organization was formed, and some 200 houses were built, sanitary in every respect. The matter was not gone into with any particular desire to make money, but very much to our surprise at the close of the fiscal year it was shown that the concern, although it attempted to make the rents so that they would be attractive, had made 10 per cent. on the investment. The capital was increased and the increase was over-subscribed five to one. We expect in the course of another year to have not less than 1,000 of these sanitary houses built for the benefit of the employees of the different corporations in Youngstown. I mention this for I think that we have set a good example. The Jones &

Loughlin Steel Company is doing something in the same line.

I believe I stated at our last gathering that the pig iron end of this business had been neglected and overlooked. I have felt that for several months, and I still feel that way. We all agree that there is an overproduction. There are more furnaces built than are needed. In the early times there was a shortage. As I stated a few years ago at one of the early meetings, the independent furnaces made one sale of 400,000 tons to the Carnegie Steel Company before the Steel Corporation was organized. I really believe that if we had kept up the policy of buying from the independent companies we would have a much more healthy condition of affairs than we have today.

I firmly believe that in order to get the pig iron business and the steel business and the whole fabric in better shape we must make up our minds to increase our exports. Take Germany, England, France and Belgium; a large proportion of their output is sent elsewhere. On the contrary, we in the United States consume the great bulk of our product. In the future we must do one or two things—either restrain the further building of capacity or increase our exports.

I think we should try to form a national association of pig iron manufacturers, not with the idea of sustaining prices but with the idea of co-operating on the same lines that have been followed in the finished end. That I think applies more especially to the manufacture of foundry iron. The great bulk of the pig iron on hand in this country is foundry iron. The amount of steel making iron that has accumulated could be used up in a week, and if they would shut down for a month there would not be a ton of any sort of pig iron left. I earnestly hope that through the American Iron and Steel Institute or in some other way the producers of pig iron will get together and bring about a better condition of affairs.

#### Willis L. King

We are met together again through the courtesy of Judge Gary to renew and cement our friendship and get the consensus of opinion as to the condition of business and its future. It is certain that there is something out of gear; but we cannot find it in the basic conditions, for our crops and finances were never better. We are apt to think when these basic conditions are right that nothing much can be amiss. But even imaginary troubles unfortunately have the power to create doubt and then fear, and that is why we are suffering from the extra session of Congress, with its free trade tendencies, and from the delay of the Supreme Court and—I say this with great respect—for its inability to say just what the Sherman Act means. The great majority of thoughtful people believe that this country cannot be prosperous without an adequate protective tariff. But these people I think are unduly alarmed concerning the action of the House, for certainly free trade is not imminent or possible with a Republican President and Senate. And when the country gets over its scare, as in due time it will, I have the faith to believe that the business then offering will tax our facilities, great though they are.

We must be patient, however, for we will have to wait perhaps a long time. But in the meantime we should conserve our own interests, for the average buyer always wants the lowest price, the cost price, regardless of all conditions, especially when business is slack. We cannot create a demand of 100 per cent. nor tell when it will come, neither can any one or more of us run 100 per cent. on a demand of 60 per cent. But this we can do: we can run our mills according to the demand, and ask a fair and reasonable price for what we produce, and this in my opinion is the sensible and proper thing for us all to do. But should any of us elect to do the impossible, then this epigram of Benjamin Franklin will give advance information as to our finish: "He that spits against the wind spits in his own face."

#### Judge Gary

I would like to say that probably we will not have the pleasure of meeting at dinner again until autumn, until after some of us have returned from Europe; but in the early autumn I hope you will be good enough to come again to one of these dinners. And I hope in the meantime you will try and keep in close contact, that the feeling of friendly interest one for the other will continue

and remain solid, that no one will become demoralized by misrepresentation in regard to what others are doing or by business conditions that are not entirely satisfactory. We will accomplish more for ourselves if we try to benefit our neighbors. If anyone does anything that our company believes ought not to be done, with respect to trying to get away our business unfairly, we will be glad to go to that person and ascertain the facts before we rush out into a competition that will be destructive and bitter and opposed to the best interests of all the people. And I hope that disposition will control the action and feeling of everyone who is present here this evening.

Never before in the history of the iron and steel business in this country has the business been in such fine, careful, honest, intelligent management as it is at the present time. Never before has there been so large percentage of the iron and steel interests of the country disposed to come together and consider one another's interests as at the present time. There was a period when, from information, I supposed there were men engaged in the manufacture of iron and steel who were not at all inclined to be fair and reasonable in trying to keep within the domain of their natural legitimate business, and who were not inclined to accept an invitation to such a dinner as this for the purpose of exchanging friendly greetings. But I found by inquiry and by personal contact that I had been entirely mistaken. There are gentlemen here this evening of whom I entertained feelings of suspicion in regard to their intention to deal fairly and justly by their neighbors; and I am very glad to say that it was simply because I was misinformed that I entertained the opinion I held at that time. I have learned by personal contact with these gentlemen that they have exactly the same feelings, the same inclinations, the same desires and intentions that all the rest of us have. We may depend upon them; when they say they are doing a certain thing we know they are doing it. Of course, as I have said before, I would not under any circumstances ask such a man or any man to make an agreement with me as to what he would do, because I know that is not proper, because I know that is illegal, because I know it would not be approved but would be disapproved by the administrators of the law; and I would not ask any man to do what I would not do myself. I know that if we succeed as business men we must do it on principles that are honest, fair, lawful and just, and therefore we may not make any agreements of any sort or description, expressed or implied or by inference. And yet at the same time I feel confident that when I come into the open and say to any of you gentlemen that I am charging certain prices or that I am shipping certain quantities you know I tell the truth, that you can rely upon that, you can depend upon it. You know I do not say that for the purpose of deceiving you at all, nor for any purpose except to let you know exactly what I am doing. And therefore, as I have said before, gentlemen, we come together upon a platform that involves the honor of a man, which is far better and far higher and far more binding upon us than any contract which we could make.

Now, gentlemen, with my gratitude for your presence and my hope that you may keep well, strong and happy, and that your business will be prosperous, and that your feeling of friendship for one another and for me will in no respect be abated during the summer, and that we may meet in the early fall, I bid you good night.

Willis L. King then proposed in the following words a toast to Judge Gary, to which the guests heartily responded: "One of the poets has beautifully said that friendship is the wine of life, another that friendship is a sheltering tree. Here is to the man who has brought this boon to the iron and steel masters of America, who, while still competitors, are proud to call themselves friends."

#### Those in Attendance

M. Andrews, M. A. Hanna & Co., Cleveland.  
George Bartol, General Manager, Otis Steel Company, Cleveland.  
A. F. Banks, President, Elgin, Joliet & Eastern Railway Company, Chicago.  
L. E. Block, Vice-President, Inland Steel Company, Chicago.  
W. L. Brown, Pickands, Brown & Co., Chicago.  
E. J. Buffington, President, Illinois Steel Company, Chicago.  
J. G. Butler, Jr., President, Bessemer Pig Iron Association, Youngstown, Ohio.  
James Bowron, President, American Brass & Copper Company, New York.  
J. A. Campbell, President, Youngstown Sheet & Tube Company, Youngstown, Ohio.  
Henry Chalfant, President, Spang, Chalfant & Company, Pittsburgh.

Capt. H. S. Chamberlain, President, Youngstown Sheet & Tube Company, Youngstown, Ohio.  
 E. B. Cook, Manager, Warwick Iron & Steel Company, Pottstown, Pa.  
 G. G. Crawford, President, Tennessee Coal, Iron & Railroad Company, Birmingham, Ala.  
 E. A. S. Clarke, President, Lackawanna Steel Company, Buffalo.  
 D. M. Gleason, President, Carnegie Natural Gas Company, Pittsburgh.  
 F. H. Crookard, Vice-President, Tennessee Coal, Iron & Railroad Company, Birmingham, Ala.  
 Daniel Coolidge, President, Lorain Steel Company, Johnstown, Pa.  
 Harry Coulby, President, Pittsburgh Steamship Company, Cleveland.  
 A. C. Dinkey, President, Carnegie Steel Company, Pittsburgh.  
 R. H. Edmonds, Editor, *Manufacturers' Record*, Baltimore.  
 B. F. Fackenthal, Jr., President, Thomas Iron Company, Easton, Pa.  
 J. A. Farrell, President, United States Steel Corporation, New York.  
 E. C. Felton, President, Pennsylvania Steel Company, Philadelphia.  
 W. J. Filbert, Comptroller, United States Steel Corporation, New York.  
 A. I. Findley, Editor, *The Iron Age*, New York.  
 E. H. Gary, Chairman, United States Steel Corporation, New York.  
 E. G. Grace, General Manager, Bethlehem Steel Company, South Bethlehem, Pa.  
 J. A. Hatfield, President, American Bridge Company, New York.  
 C. R. Hubbard, President, Wheeling Steel & Iron Company, Wheeling, W. Va.  
 A. F. Huston, President, Lukens Iron & Steel Company, Coatesville, Pa.  
 O. N. Hutchinson, General Manager, Grand Crossing Tack Company, Grand Crossing, Ill.  
 August Heckscher, Vice-President, Eastern Steel Company, New York.  
 E. M. Hagar, President, Universal Portland Cement Company, Chicago.  
 Harry R. Jones, General Manager, United Steel Company, Canton, Ohio.  
 Jonathan R. Jones, Secretary and Treasurer, Alan Wood, Iron & Steel Company, Philadelphia.  
 J. A. Kelly, President, Ashland Steel Company, Ashland, Ky.  
 L. A. Kelly, Jr., Superintendent, Ashland Steel Company, Ashland, Ky.  
 D. C. Kerr, Vice-President, United States Steel Corporation, New York.  
 Willis L. King, Vice-President, Jones & Laughlin Steel Company, Pittsburgh.  
 W. H. Love, President, New York State Steel Company, Buffalo.  
 G. G. McMurtry, Chairman, American Sheet & Tin Plate Company, New York.  
 James T. McCleary, Secretary, American Iron and Steel Institute, New York.  
 John McGinley, Vice-President, West Penn Steel Company, Brackenridge, Pa.  
 F. C. McMath, President, Canadian Bridge Company, Walkerville, Ont.  
 Benjamin Nicoll, B. Nicoll & Co., New York.  
 Chas. D. Norton, Vice-President, First National Bank, New York.  
 W. J. Olcott, President, Oliver Iron Mining Company, Duluth, Minn.  
 W. R. Palmer, President, American Steel & Wire Company, Cleveland.  
 E. W. Pargny, President, American Sheet & Tin Plate Company, Pittsburgh.  
 John A. Penton, Managing Editor, *Iron Trade Review*, Cleveland.  
 Geo. W. Parkins, New York.  
 Chas. S. Price, President, Cambria Steel Company, Johnstown, Pa.  
 Leonard Peckitt, President, Empire Steel & Iron Company, Catawissa, Pa.  
 W. B. Perley, Assistant to President, United States Steel Company, New York.  
 Chas. A. Rathbone, Buhl Malleable Company, Detroit.  
 J. H. Reed, Chairman, Carnegie Steel Company, Pittsburgh.  
 Davis Reeves, President, Phenix Iron Company, Philadelphia.  
 F. B. Richards, M. A. Hanna & Co., Cleveland.  
 Karl G. Roebling, John A. Roebling Sons' Company, Trenton, N. J.  
 W. A. Rogers, President, Rogers-Brown Iron Company, Buffalo, N. Y.  
 F. H. Rose, General Sales Manager, Upon Nut Company, Cleveland.  
 Wallace H. Rowe, President, Pittsburgh Steel Company, Pittsburgh.  
 James P. Roe, General Superintendent, Glasgow Iron Company, Pottstown, Pa.  
 John Reis, Vice-President, United States Steel Corporation, New York.  
 Geo. L. Reis, Vice-President, Minnesota Steel Company, Duluth, Minn.  
 W. B. Schiller, President, National Tube Company, Pittsburgh.  
 C. A. Severance, Davis, Kellogg & Severance, St. Paul, Minn.  
 Moses Taylor, Vice-President, Lackawanna Steel Company, New York.  
 Alexis W. Thompson, President, Inland Steel Company, Chicago.  
 J. A. Topping, Chairman, Republic Iron & Steel Company, New York.  
 Richard Trimble, Treasurer, United States Steel Corporation, New York.  
 E. P. Thomas, President, United States Steel Products Company, New York.  
 W. R. Walker, Assistant to President, United States Corporation, New York.  
 F. S. Witherbee, President, Witherbee, Sherman & Co., New Point, Md.  
 F. W. Wood, President, Maryland Steel Company, Sparrows Point, Md.  
 W. P. Worth, Treasurer, Worth Bros. Company, Coatesville, Pa.  
 F. A. Wilmot, President, American Tube & Stamping Company, Bridgeport, Conn.  
 August Ziesing, President, American Bridge Company, Pittsburgh.

## The Philadelphia Foundrymen's Association

The Philadelphia Foundrymen's Association held its regular monthly meeting at the Manufacturers' Club, Philadelphia, Pa., on the evening of May 3, George C. Davis occupying the chair. Quite a representative attendance of local and out of town members was present. Crocker Brothers, pig iron and coke merchants, Pennsylvania building, Philadelphia, represented by Charles H. Newcomb, were elected to membership.

Secretary Howard Evans made a report for the committee having in charge plans for attending the Pittsburgh convention of the American Foundrymen's Association, May 23 to 26. It is proposed that the association furnish a special Pullman sleeping car, without expense to the members, leaving Broad Street Station, Pennsylvania Railroad, Monday evening, May 22, at 9:02 o'clock. Members may return at their leisure, no plans being made for the return trip. Members wishing to join the party will communicate at once with Secretary Evans, Pier 45, North Wharves, Philadelphia.

### Shepard Overhead Handling Devices

The paper for the evening's discussion was on, "Electric Overhead Handling Devices for Foundries and Other Industries," by James A. Shepard, chief engineer Shepard Electric Crane & Hoist Company, Montour Falls, N. Y. Mr. Shepard prefaced his address, which was illustrated by a large number of lantern slides, by a discussion of elements of cost, of which the following is a part:

How many of us have compiled any careful record of the percentage of the weekly pay roll which is absorbed by inefficiently organized processes, or from delays of one sort or another, by which production is momentarily or longer delayed? How many of us have been pinning our faith to the "speeding up process," but have failed to remember that much more can be accomplished by keeping things moving at even a moderate pace? If we have tolerated delays and inefficiency at any point, has proper consideration been given to the frequency with which the little leaks repeat themselves?

Do any of us in the conduct of our foundries continue to unload pig iron by hand and perhaps wheel it, a couple of hundred weight at a time, across the yard to the cupola? Forgive me if I consider it entirely possible. I know of one foundry in another city which melts about 200 tons of iron per day and handles every pound of it by hand or in wheelbarrows.

Do we handle the molding sand, the coke, coal, slag and cinders in the same manner?

Probably few, if any of us, would answer in the affirmative as to all of the operations named: also few, if any of us, could answer in the negative as to all of these operations. Yet the handling of the materials represents for the year a large expenditure, because handling is an operation which is often repeated. Let us enumerate some of them: The iron from car to storage pile; storage pile to cupola; cupola to molds; molds to cleaning room; often several handlings in process of cleaning; cleaning room to final delivery.

If there is any delay, so that castings cannot proceed from an operation directly to the next, it may add one or two additional handlings. But there are at least six handlings. For each ton of finished castings you will have handled from one and one-fourth tons to two tons of raw material, not counting coal, coke, sand, cinders, etc., which should account for about 25 per cent, addition, giving an average total of about eleven tons handled once for each ton of finished castings.

So far we have considered the actual work of handling, but during these several handlings skilled mechanics have been more or less delayed by lack of expeditiousness; hence another item of expense often not given sufficient consideration, but representing an important item in the final account.

We have also neglected the matter of handling the molds, because it is assumed that every modern foundry is provided with crane service over the molding floors where the character of the work done warrants it. But does this type of hoisting apparatus just meet your requirements, or if it does should it not be supplemented by auxiliary hoists in small units so that several molders are not frequently compelled to wait while the large crane is serving one?

Mr. Shepard then described, by means of some 60 lantern slides, various types of overhead hoisting apparatus manufactured by his company, in use in foundries, workshops, storage yards, sugar houses and in other connections where extraordinary conditions prevail, explaining the particular adaptability of the devices under varying circumstances. He was given a vote of thanks for his interesting paper.

The Alamo Iron Works, San Antonio, Tex., in addition to building a planing mill and carpenter shop, has recently installed considerable new machinery, among which are the following: One 27 in. x 16 ft. Lodge & Shipley patent head lathe; one gang radial drill, 4 ft. arm; one Buffalo Forge Company splitting shear; one 8-in. pipe machine; two punches and shears for the sheet iron shop; one 1500-lb. double frame steam hammer. The company has also contracted for a steel frame saw-tooth roof blacksmith shop, 40 x 60 ft. With the equipment enumerated, the capacity of the plant will be about doubled and no further improvements will be made in the near future.

The Eastern Steel Company announces the removal, May 1, of its New York office to 60 Broadway.

## The Pennsylvania Steel Company's Report

The Pennsylvania Steel Company's report for the year ended December 31, 1910, gives the combined income account for that company and its subsidiaries as follows:

	1910	1909
Income from operation.....	\$3,779,824	\$3,809,458
Other income.....	249,370	196,821
 Total income.....	 \$4,029,125	 \$4,006,279
Interest on bonds, etc.....	\$1,702,918	\$1,441,379
Depreciation .....	855,403	526,854
Preferred dividends, 7%.....	1,412,293	1,155,000
 Surplus .....	 \$38,581	 \$883,044

The above figures for income in 1910 are after payment of all expenses of operations, including \$4,903,463 for ordinary and extraordinary repairs and upkeep.

The 1910 surplus is equal to 0.54 per cent. on \$10,750,000 common stock, as compared with 8.21 per cent. earned on the same stock previous year.

The production of pig iron and steel ingots in the past two years was as follows:

	Gross Tons.	Steel
	Pig Iron.	Ingots.
1910 .....	757,000	847,000
1909 .....	700,000	800,000

The production of coal, coke and iron ore was as follows:

	1910	1909
Coal .....	790,000	890,000
Coke .....	771,000	698,000
Iron ore .....	1,471,000	1,000,000

The combined balance sheet as of January 1, 1911, is as follows:

	Assets.	
Property owned and operated.....	\$43,785,911	
Sundry securities.....	1,139,479	
Sinking funds.....	510,873	
Materials, supplies, etc.....	8,913,595	
Accounts receivable.....	4,389,821	
Bills receivable.....	489,068	
Cash .....	881,132	
 Total .....	 \$60,109,879	
	Liabilities.	
Preferred stock.....	\$20,560,800	
Common stock.....	10,750,000	
Stock of subsidiary companies not owned.....	12,700	
Bonded debt.....	20,679,000	
Accounts payable, and pay rolls.....	1,728,926	
Dividend payable May 1, 1911.....	719,628	
Accrued interest and taxes.....	297,835	
Profit and loss.....	5,360,990	
 Total .....	 \$60,109,879	

In 1910 the subsidiary companies were actively engaged in starting new operations and in the introduction of new methods of manufacture. In connection with mining operations in Cuba an initial organization was formed out of unskilled laborers for operating the new, and in many respects unique, machinery for mining and transportation, an unusually difficult task, and one which involved large expense. High costs for the first year were the natural results of these conditions. The difficulties encountered have been largely overcome, and an efficient force of men has been gathered together. During the same period the open hearth plant at Sparrow's Point was completed and started, and new methods of manufacturing steel were being perfected, both there and at Steelton, in connection with the use of the new Cuban ores, all of which of necessity increased costs. Notwithstanding these unfavorable conditions, these companies were able to charge more than in 1909 directly to depreciation, and to make larger payments to sinking funds, which latter, in reality, are also allowances for depreciation.

The company's coal mining properties, located in Cambria and Indiana Counties, Pennsylvania, consist of about 16,000 acres of coking coal lands, on which five mines are operating. They produced 790,000 tons of coal in 1910, as compared with 890,000 tons in 1909, the decrease being due to scarcity of labor early in the year. Iron ore is derived from Cuba and the mines at Cornwall, Pa.,

in which latter the controlling interest is owned by the company. In 1910 the mines near Santiago, Cuba, which have been owned for the last ten years, produced 523,000 tons of hard hematite ore. The mines can be relied on for some years to produce 500,000 tons of ore annually, but future supplies will come from the new mines on the north coast of Cuba, at Mayari and Moa, which contain about 1,400,000,000 tons of iron ore. The deposit consists of a shallow blanket of ore about 18 ft. deep, covering a great area, and contains, in addition to iron, nickel and chromium, both of which elements are very desirable and valuable in the manufacture of a large variety of steel products. The ore is fine and moist, and a considerable portion of it must be dried and sintered before it can be economically transported and used in the blast furnace. In 1910 there were mined at these new properties 411,000 tons of ore. The mines at Cornwall, in which the company owns 54 per cent. interest, produced 537,000 tons in 1910, compared with 478,000 tons in 1909. Early in the year the new plant for hoisting, crushing, sorting and storing ore was put into operation. This plant has cost \$500,000, which has been paid out of earnings of the ore property. Increased production and lessened cost have resulted.

The report describes the various manufacturing plants owned by the company, as well as the railroad lines and other properties, and dwells on the great strides made in the past 10 years in securing adequate supplies of raw materials.

## Chilean Buyers in New York

The Goulds Mfg. Company, 16 Murray street, New York, states that its office is temporarily being made the headquarters of Louis I. Munoz and Ramon Vidal, who represent the firm of Morrison & Co., Valparaiso, Chile, having branch houses at Santiago, Concepcion, Talcahuano and San Felipe, Chile. Morrison & Co. are engineers and general importers of hardware and engineers' supplies and are contractors to the Chilean navy and state railroads. Heretofore this firm has been conducting its business for material purchased in the United States to be shipped to its establishments in Chile through commission houses in New York, but has now decided to establish its own offices in New York, London, Hamburg, and possibly Paris, and from these branch offices will make its own purchases and make its own shipments to Chile.

The gentlemen above-named will remain here long enough to place their New York office on a satisfactory working basis, and will then proceed to London. In the meantime, it is their desire to be put in communication with manufacturers of general hardware and engineering supplies, cutlery goods, silverware, sanitary material and plumbing supplies in general, house furnishings, mining supplies, naval stores and railroad supplies. Under no circumstances will they deal with agents or jobbers; they must have direct contracts with the manufacturers. They will have their headquarters at 16 Murray street, New York, for at least a month, and those manufacturers who would like to make their acquaintance should address a letter to them in care of the Goulds Mfg. Company, asking an appointment. It is imperative that appointments be made in advance, as they have great pressure of business on hand, and so that intending visitors will not, of necessity, be kept waiting.

## April Copper Production and Stocks

The Copper Producers' Association has issued its monthly statement for April as follows:

	Pounds.
Stock of marketable copper of all kinds on hand at all points in the United States April 1.....	162,007,934
Production of marketable copper in the United States from all domestic and foreign sources during April.....	118,085,223
Deliveries of marketable copper during April:	
For domestic consumption.....	52,407,650
For export.....	62,129,599

Total .....	114,537,249
Stock of marketable copper of all kinds on hand at all points in the United States May 1.....	165,555,906

These figures show an increase in stocks from April 1 to May 1 of 3,547,974 lb. There was a decrease of 12,446,857 lb. in the month's production as compared with that in March.

## German Automobiles

### Depreciation and Repair Cost

Engineer A. Koenig, for many years appraiser in German automobile insurance affairs and at inventories of automobile stocks, writes in *Der Motorwagen* an article on the methods of figuring depreciation of pleasure automobiles. From the data he supplies an interesting comparison may be instituted between the durability of parts and equipments there and here. The German expert writes in part as follows:

"Insurance companies figure on a depreciation of 20 per cent. from the first year's use of a private automobile and 15 per cent. for each year thereafter. Some companies include the tires in the valuation, others refuse to consider them. The 'life' is figured on a basis of five or six years, that of cabs and omnibuses as four or five years. Modern automobiles have a much longer period of usefulness in reality, but their depreciation should, on the other hand, be figured on a more rapid scale and progressively, partly by reason of the loss in value by demodernization.

"The durability of parts and accessories varies greatly in the different makes of machines, yet constitutes the only basis for figuring depreciation. The amount of service given to a car, while in reality of great importance, can in practice only be averaged. The following data of durability are based on average construction and average service and in some cases give a low and a high figure corresponding somewhat to the variations found in practice:

1.—Varnish, upholstering, coverings and casings, rugs, mats and fenders must be replaced in one to two years. The carriage body-work also requires some repairing in the same period. Ordinarily, replacement of the body is not required within the amortization limits; that is, the period of six to eight years over which the investment in an automobile is financially considered as extending.

2.—All motor bearings must be scraped, recast or replaced in one to one and one-half years. Gear pinions for the cam shaft, magneto and pump are to be replaced in one to three years, according to the large variations in strains, materials and service.

3.—A cone clutch is every year to be provided with new leather, and a multiple plate clutch demands a similar outlay.

4.—Brakes should as a rule every year be provided with new wearing surfaces and with new bolts for the brake rods. Chains and universal joints require annual renewal.

5.—The change-gear box requires usually a complete overhauling every three years, especially renewal of the driving pinion and of all bearings. Also the differential, with its bevel gears and their bearings, requires renewal within three years.

6.—The joints in the steering gear, the worm, balls and sockets of the ball joints must be overhauled every two years.

7.—Magnets and induction coils last about two years. All cables must be renewed after the same period.

8.—The operating rods and gears for carburetor and ignition control, as well as for gear-change and brake control, must be thoroughly worked over every two to three years, especially by renewal of bushings in joints and bearings.

9.—Ball bearings in front and rear wheels last about three years.

10.—Wooden-spoked wheels are to be renewed in four to six years, as they finally work loose in the tenons and expand and shrink with the weather.

11.—Springs show greatly varying durability. Some last ten to twenty years and still show no change, while others must be annealed and retempered after two years.

12.—Bushings and bolts for spring eyes and shackles must be replaced every three years.

13.—Aluminum casings for crankshaft and transmission usually outlast the amortization period of six to eight years.

14.—Front and rear axles usually have a life of ten to sixteen years, barring collisions.

15.—The frame lasts ten to sixteen years when riveted; longer when welded.

16.—Radiators require thorough repair after about two years, consisting in straightening of bent tubes, cleaning of water channels, replacement of injured tubes or honeycomb sections, soldering of leaks. Complete replacement is usually advisable after four to five years. The motor bonnet is ready to be replaced in three to four years.

17.—Oil tanks, oil ducts and the carburetor require overhauling every two to three years.

18.—Gasoline tanks show an average life of six to ten years.

19.—The gasoline pipes and their connections are subject to repair every one to two years.

20.—The water pump with its connections is to be overhauled every two years.

21.—The tool equipment, lamps and reflectors, the folding top, window panes, the various accessories and luxuries, such as interior lamps, speaking tube, signal apparatus, odometer, etc., may be figured to require some repair or replacement every year.

The depreciation of an automobile after a certain time of service is figured from the following three items: 1. The cost of the repairs required in order to establish the vehicle in perfect condition; 2. The share, pro rata, of the elapsed time in the cost of repairs to be expected, for the first time, in the subsequent years of the vehicle's expected life; 3. The loss due to demodernization, depending on changes in style and progress in construction since the vehicle under consideration was built.

It is common among insurance companies or for financial appraisement purposes to figure that repairs of pleasure automobiles will amount annually to 8 to 10 per cent. of the first cost; for cabs, motor trucks and delivery wagons

to 10 to 15 per cent. and for automobile omnibuses to 15 to 20 per cent., but in readily the relations between first cost and repair cost run very differently; the first cost does not afford a reliable criterion. Frequently the first year of an automobile's life gives occasion for no repairs whatever, but in the case of untried constructions the repair cost during the first year, while the designer's or manufacturer's errors are being corrected, are often higher than in subsequent years.

The average repair cost for an automobile costing 15,000 marks, without tires, runs about as follows: For the first year, 800 marks; for the second year, 1300 marks; for the third year, 2400 marks, the repairs of the first year being repeated each of the following years and new ones added. The beginning of the fourth year now presents an automobile which is practically new in all parts subject to rapid wear. At the end of the fourth year the repairs made at the end of the second year are repeated. Repairs during the fifth year would be light but for the expensive replacements of wheels and radiator which it is usually advisable to undertake during this period. The first three years, taken as a whole, average a repair cost of 15 per cent. An increase of 2 to 3 per cent. may be estimated for each of the following years, making the repairs in the fifth year amount to 20 per cent. and in the tenth year to 33 1/3 per cent. It seems practical to consider the first three to four years a closed period for which repairs should be averaged and to add 2 to 3 per cent. afterward. This applies as well to cabs and trucks and delivery wagons.

### The Porceliron Stove Company

The Porceliron Stove Company has been organized at Beaver Falls, Pa., and has applied for a charter with a capital of \$25,000. It proposes to engage in the manufacture of a general line of gas and oil stoves and ranges, with other specialties, from cast iron and a new material known as porceliron. The latter is a combination of wrought iron and porcelain which is treated by a special process, made from a secret formula, and will be covered by several patents which are now pending. It has the appearance of porcelain and the strength of iron. It is especially made to resist breakage, is a non-conductor of heat and has been developed particularly for use in connection with stoves and ranges. The designs will be copyrighted. The product is a radical departure from anything in this line in the United States.

The company will occupy the building formerly occupied by the Enamored Iron Company of Beaver Falls, which is the property of the incorporators. It expects to start operations with fifty skilled mechanics and will begin operations as soon as the patterns and designs are completed. The castings required will be purchased in the open market at first, but the company expects to build a large foundry later. It will be in the market for valves and trimmings in large quantities and also for tools consisting of motors, drills, presses, grinding and polishing machinery. Its line of product is to be ready for market by fall.

**A Railroad Shippers' Service.**—The Kridler System, expert traffic manager, 227 B. of L. E. Building, Cleveland, Ohio, is carrying on a valuable work for shippers and receivers of freight. The idea which it is pushing is to furnish shippers with expert railroad advice and to so handle all railroad matters that such shippers may be protected against overcharges and losses in connection therewith. The concern has been in business for two years and has a complete file of railroad tariffs and other information, enabling it to carefully and correctly verify any railroad bill, to furnish rate quotations and to compile rate sheets. Judging from letters of commendation received from its clients, the Kridler System is worthy of a trial by those who are without expert service in these matters.

**The Myers Pump & Mfg. Company.**—The Myers Pump & Mfg. Company, St. Joseph, Mo., has been incorporated with \$60,000 capital stock. It has been operating a plant at St. Joseph which it will move to a new location, and would like to hear from any city desiring to secure its plant. When a location has been selected it will erect a factory building, about 60 x 150 ft., in addition to a separate foundry building, both of which will be thoroughly equipped.

# Milling Cutters and Their Efficiency\*

## A Comparison of the Various Types

BY A. L. DE LEEUW, CINCINNATI, O.<sup>t</sup>

The amount of metal which a machine tool can remove in a given time is limited by the strains caused by the cut. Great hardness of the material to be cut, or a dull tool, will severely strain the machine and so reduce the section of the chip, even if the machine is rigidly constructed and well supplied with driving power. This limitation of cutting capacity occurs in all metal cutting machines, although to a varying extent. While it is possible to increase the driving power of most machines ad-libitum, and almost any amount of metal can be put into machine elements to give them rigidity, there are certain classes of machines where practical considerations limit such increase of power and strength. This is especially true in machines where the main elements have to be adjusted and handled with great frequency.

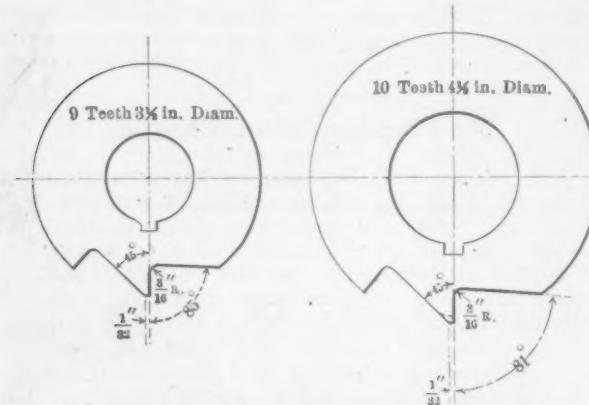


Fig. 1.—The Form of the Spiral Milling Cutters Now Used by the Cincinnati Milling Machine Company, Cincinnati, Ohio.

The knee-and-column type of milling machine owes its success to a large extent to the ease and rapidity with which it can be manipulated, and it is doubtful if it will ever be possible to increase the dimensions of the parts much beyond the present sizes, without losing the benefits of the peculiar construction of this type of machine. To increase the capacity of this type of milling machine it becomes necessary to reduce the strains set up by the cut, and there are only two elements which can be modified to accomplish this result. These are the hardness of the metal to be cut and the cutting qualities of the milling cutter. As it is impossible to control the first of these, the only avenue left for improvement leads in the direction of the milling cutter.

Experiments carried on at the works of the Cincinnati Milling Machine Company and extending over several years, starting with some isolated and almost desultory trials and gradually becoming a series of carefully planned experiments, have led to results which are believed to be of general interest. These tests embraced spiral mills; end mills, both of the shell end-mill type and the spiral taper-shank type; side mills, slitting saws, face mills and a new type of mill which for lack of a better name is called here a helical mill.

### Action of Milling Cutters

The action of the ordinary milling cutter is not a true cutting action, as it is commonly understood. By a true cutting action is meant the driving of a wedge-shaped tool between the work and the chip, and although this definition is not based on a generally accepted meaning of the term, it is believed that it expresses fairly well what most mechanics understand by cutting. Practically all milling cutters have their teeth radial, and this, of course, excludes the possibility of driving a wedge between chip and work. The tooth compresses the metal until it produces a

strain great enough to cause a plane of cleavage at some angle with the direction of the cutter. It then begins to compress a new piece, push it off, and so on. This at least seems to be the action of the cutter, judging by the form of the chips. These chips are in the form of needles

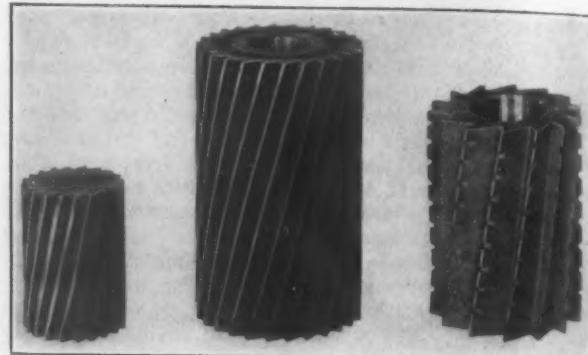


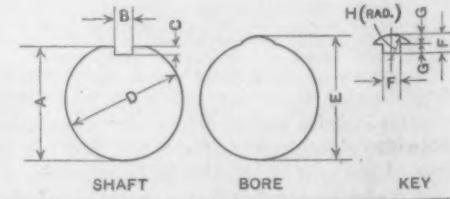
Fig. 2.—A Comparison of the Different Types of End Mills.

or small bars. The chip taken by a milling cutter varies very materially from those taken by a lathe or planer tool. These latter tools make chips of uniform section, whereas the section of a milling chip increases from zero to a maximum. This peculiar action of the milling cutter is inherent in its construction and cannot be avoided. The question, then, is how to minimize the harmful results of this action.

Another feature, which limits the ability of a milling cutter to remove metal, is the proportion between the chip to be removed and the amount of space between two adjoining teeth. Such a limitation does not exist with lathe or planer tools, where the chips have unlimited space in which to flow off. That this proportion between chip and chip space actually does form a limiting condition is well known, and was brought most forcibly to the writer's attention when a large and powerful machine stalled, taking a cut in cast iron about 1 1/2 in. wide, 3-16 in. deep and 12 1/2-in. feed per minute. Several times this amount of metal can be easily removed by the same machine without sign of stress; yet the machine was incapable of removing more than 3 cu. in. of cast iron per minute with this cut. Investigation showed that the amount of cast iron removed per tooth was sufficient to fill the chip space completely, and from that moment the action was like trying to push a solid bar of steel through a piece of cast iron. Another cutter, with more chip space, removed the same amount of metal with only a fraction of the power of the machine.

### Development of New Spiral Cutters

Gradually cutters have taken the forms shown in Figs. 1 and 2. Two standard sizes are used, although other



A	B	C	D	E	F	G	H
0.973672	5/32	5/32	1	1.05179	5/32	5/32	1 1/32
1.03770	5/32	5/32	1 1/16	1.11592	5/32	5/32	1 1/32
1.21875	3/16	5/32	1 1/4	1.3125	5/16	5/32	1 1/4
1.4543	1/2	1/8	1 1/8	1.5793	1/4	1/8	2 1/8
1.7111	1/4	1/8	1 1/8	1.8301	1/4	1/8	3 1/8
1.94734	5/16	5/32	2	2.10350	5/16	5/32	1 1/32

Fig. 3.—The Various Dimensions of Keys for Milling Cutter Arbors.

\*From a paper to be presented at the spring meeting of the American Society of Mechanical Engineers, Pittsburgh, May 30-June 2.

<sup>t</sup>Mechanical Engineer, Cincinnati Milling Machine Company.

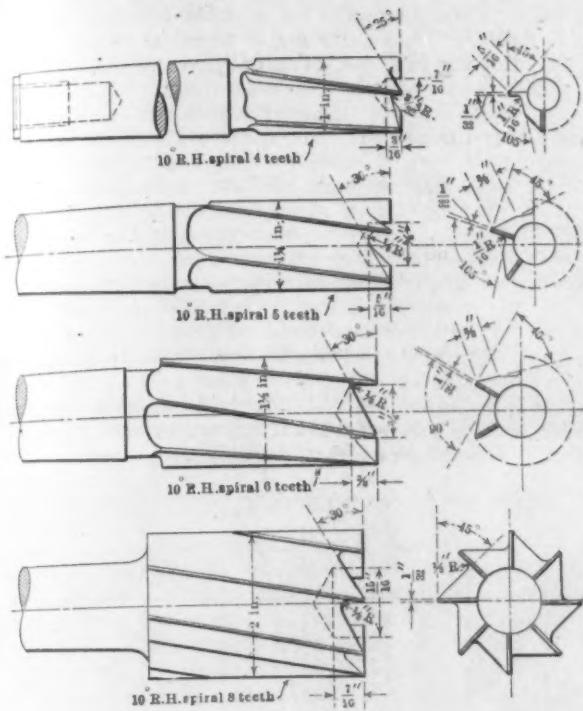


Fig. 4.—The New Type Taper Shank End Mills.

diameter cutters are made with nine and the  $4\frac{1}{2}$ -in. diameter cutters with ten teeth, which corresponds to a sizes are required for special cutters and special gangs. The standard diameters are  $3\frac{1}{2}$  in. and  $4\frac{1}{2}$  in. The  $3\frac{1}{2}$ -in. spacing of about  $1\frac{1}{4}$  in. The point of the tooth has a land of  $1\frac{1}{32}$  in., and the back of the tooth forms an angle of 45 deg. with the radial line. The chip space is approximately four times as great as in the usual standard cutter of the present time and is formed with a  $3\frac{1}{16}$ -in. radius at the bottom.

Attention should be called to the fact that present practice calls for arbors which are too small. In the cutters shown here the  $3\frac{1}{2}$ -in. cutter is made with  $1\frac{1}{2}$ -in. and  $1\frac{1}{4}$ -in. arbor, and the  $4\frac{1}{2}$ -in. cutter with  $1\frac{3}{4}$ -in. and 2-in. arbor. It is often very difficult to remove cutters from an arbor after they have done heavy work. It is frequently necessary in such cases to press the arbor out of the cutters. This sticking of the cutter is caused by the burring up of the key and often the keyway in the arbor. For this reason keys are used for gangs of cutters, as shown in Fig. 3. A flat is milled on the arbor and the keyway milled central with this flat. The flat portion of the key presses against the flat part of the arbor, and this effectively prevents burring. Cutters which are held on the arbor with such a key can always be very readily removed, even after prolonged and hard work. The keys are made out of a piece of round stock, grooved at both sides and then sawed apart.

Very satisfactory results were obtained with these cutters when cuts were taken on cast-iron test blocks. A series of tests made on the left half of the block with one kind of cutter and on the right half with another cutter showed that the same amount of power was required to take a cut of  $\frac{1}{4}$  in. deep and with 10.4-in. feed with a cutter of  $\frac{5}{8}$ -in. pitch, and a cut  $\frac{1}{4}$  in. deep and with 13.5-in. feed but with a cutter of  $1\frac{1}{8}$ -in. pitch.

Though increased capacity for removing metal is one of the main advantages of this form of cutter, there are others of considerable importance. It was found that for roughing on the ordinary work in the shop a cutter with the wider-spaced teeth would remain sharp for a longer period, notwithstanding that feeds had been increased. The system of the Cincinnati Milling Machine Company requires all gangs and cutters to be resharpened after a lot of pieces has been milled. It used to be necessary, at least on the larger lots, to resharpen the gang once and sometimes twice for one lot, or if this was not deemed advisable the feed had to be reduced for at least part of the pieces, in order to make the cutter last during the entire lot. In all cases where the wide-spaced cutters were used the entire lot was run through without resharpening the cutter or reducing the feed; and it should be kept in

mind that this feed was from 25 to 100 per cent. greater than previously used. There is no case on record where the cutter or gang was dull at the end of the lot, so that our observations as to the endurance of the cutters are incomplete. However, it is perfectly safe to say that in all cases under observation the cutter maintained its sharpness longer; that in a great many cases double the amount of work could be done without resharpening, and that there is good reason to believe an even greater gain than this was obtained.

A further advantage is that as these cutters have approximately only half the number of teeth of what is now considered a standard cutter the time for resharpening is only half as much. It was pointed out that the ratio of pitch to depth is practically the same as in the present standard cutter, so that the depth of tooth is practically doubled, and this cutter can be sharpened much more frequently than the present standard cutter. Consequently the life of the cutter has been much increased, probably more than doubled.

A glance at the drawing of these cutters gives the impression that the teeth are weak, and the writer has watched this feature with great care. The cutters themselves do not give this impression; on the contrary, they look stout and well proportioned. They have been subjected to the heaviest class of work and many times were purposely abused in order to find their weak points; yet there is no case on record that any of them have broken, although they have been used for more than two years, and all breakages of cutters are carefully noted. On the other hand, breakages of the old cutters are not at all infrequent. Though these cutters are capable of removing metal more rapidly than the older type of cutter, there are many cases where this feature cannot be taken advantage of, as where light work is to be done or a small amount of stock is to be removed. In such cases the metal is removed with less power and consequently with less strain on the machine, and the life of the machine is lengthened without limiting its output. With the wide spacing of the teeth it may seem that there would be cause for apprehension as to the action of the feed, which might act with jerks. This is not the case, and, on the contrary, the feed is smoother and there is less of a jerk when the cutter first strikes the work, probably because there is less spring in the arbor and less tendency for the cutter to ride over the work.

When cast iron is milled by these wide-spaced cutters it

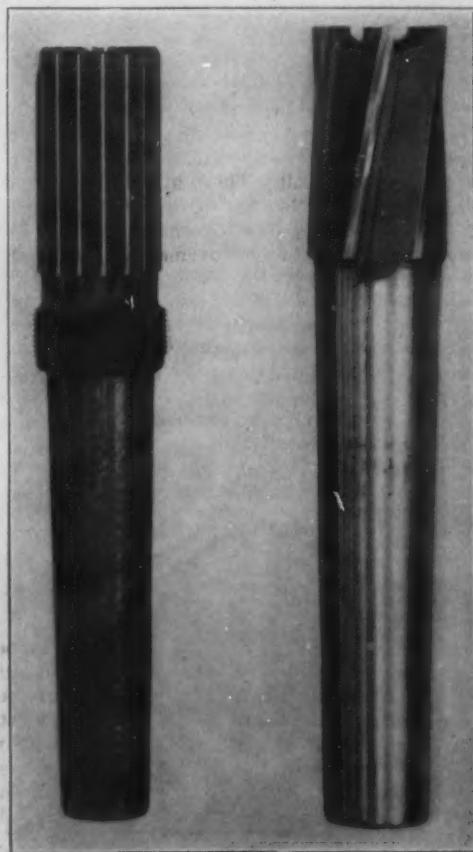


Fig. 5.—The New and the Old Style End Mills.

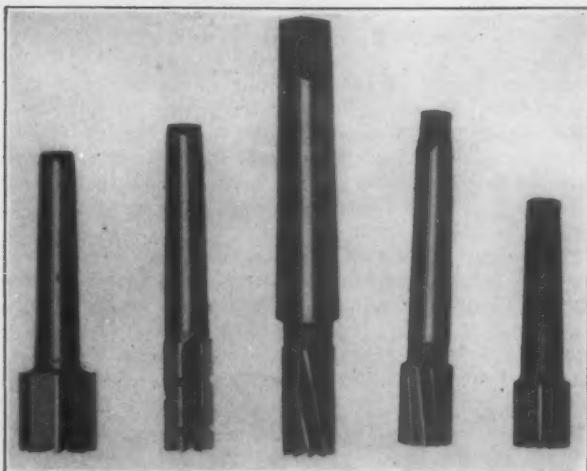


Fig. 6.—Some New and Old Style End Mills Compared.

appears to be very soft, and when the same piece is milled by an old-style cutter it appears to be much harder. When using the wide-spaced cutter there is a notable absence of jerking, chattering and of the peculiar singing noise which is so often noticed on milling machines. There is a difference in the hardness of different pieces of cast iron, and many recommendations as to the proper feeds and speeds for milling cast-iron work, made by the writer for his company, were looked at askance. The impression seemed to prevail that feeds and speeds which were possible on American iron were out of the question on European iron (especially English and German); and again, that feeds and speeds proper for western American iron were not suitable for eastern iron. To test the truth of the matter a number of bars of cast iron were obtained from different foundries in America, England, France and Germany. These bars covered a great many mixtures and makes, and the difference between English and American, or German and American iron, or between eastern American and western iron, was found to be no greater than that between different specimens of western American iron. Even German Spiegeleisen, famous for its hardness, cut just as freely as soft western iron and required but little more power. However, it did require more clearance, wide spaces and a low speed.

### **Use of Chip Breakers**

These wide-spaced cutters were originally intended for roughing operations only, but the very satisfactory finish obtained when roughing led to their use for finishing also. If there is any difference at all in the finish produced the advantage is on the side of the wide-spaced cutter. It is generally believed that for finishing alone a milling cutter should be used without chip breakers, the effect of the chip breaker being to scratch the surface. To overcome this trouble chip breakers with clearance at both corners are made. This prevents the tearing up of metal, with the result that a cutter with these chip breakers produces as good a finish as one without chip breakers. This form of chip breaker has an advantage also for roughing cuts. The point of the cutter, where the unrelieved side of the chip breaker drags over the work, is the first point to give out, and making the chip breaker with clearance on both edges prolongs the life of the cutter.

One of the great advantages of this form of chip

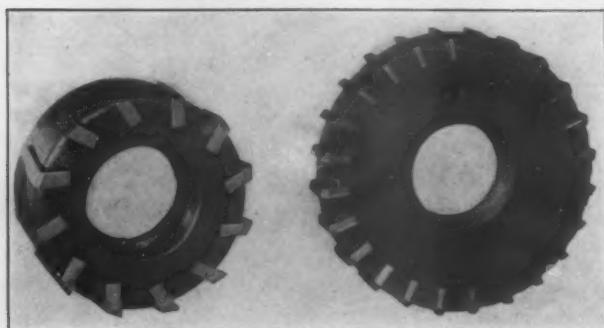


Fig. 7.—A Comparison of High Power and Regular Face Mills.

breaker is that one gang can be used for both roughing and finishing. A great many, if not most milling operations, call for two chuckings, one for roughing and one for finishing. This will be found to be necessary wherever much metal is to be removed, on account of distortion caused by the cut, the heavy clamping required, heating, spring of arbor or fixture and the unbalanced condition of the work after the scale has been removed on one side. To do the roughing as rapidly as possible chip breakers are required, and to get proper finish it has heretofore been necessary that the finishing gang be without chip breakers. It paid, therefore, to have two gangs whenever the number of pieces to be milled was sufficiently large, but this involved considerable extra expense for cutters. The new form of chip breaker, however, permits using one gang for both finishing and roughing.

It is a common belief that better finish can be obtained with teeth closely spaced, but experience with the wide-spaced cutters shows that there is no ground for this

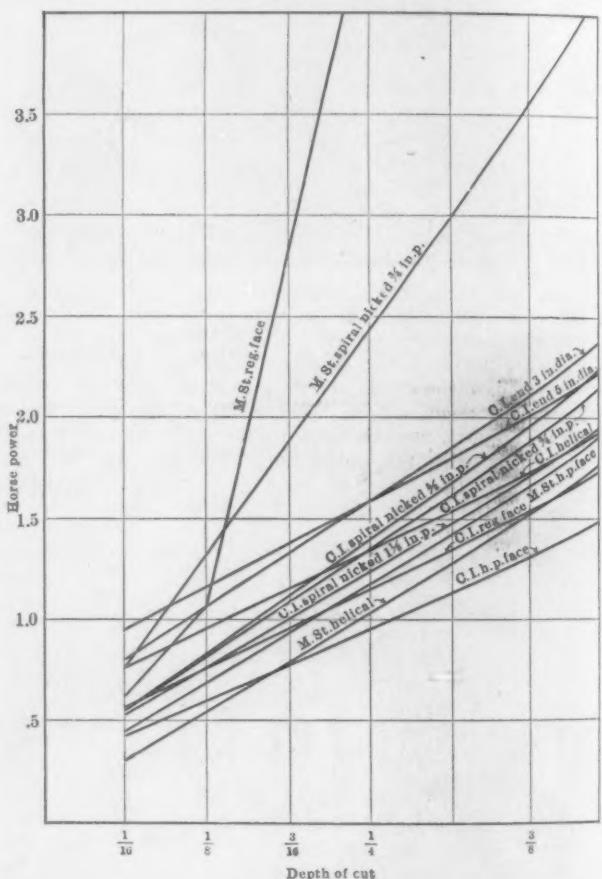


Fig. 8.—Efficiency Test Curves of Different Cutters Operating with a Feed of 4 In. per Minute.

belief. The grade of finish may be expressed by the distance between successive marks on the work, which are revolution marks and not tooth marks. It is practically impossible to avoid these revolution marks, which are caused by a number of things, each very small in any good milling machine, and yet the accumulation of these little errors is sufficient to cause a mark that needs to have a depth of only a fraction of a thousandth of an inch to be very plainly visible. As these marks are caused by conditions which return once for every revolution of the cutter it is plain that the spacing of the teeth can have no effect on the distance between them and, therefore, on the grade of finish.

To test this still further two cutters of the same size exactly were placed side by side on an arbor. The cutters were ground together so as to be sure they were of equal diameter, and they were ground on the arbor so as to be sure that the error would appear simultaneously for both cutters. A block of cast iron was finish milled with these cutters in such a way that each cutter would sweep half the width of the block. The same number of marks appeared on both sides of the block, and these marks were exactly in line with each other, as might have been expected. The grade of finish was the same for both sides.

It was neglected to mark the two sides of the casting to show which cutter was operating. After this test all of the teeth but one of one of the two cutters were ground lower, so as to be out of action entirely, leaving only one tooth of the one cutter operative. Another cut like the first one was taken over the same block, and again the finish appeared the same on both sides. There was a difference of opinion between different observers as to which side was cut by the single tooth. By close observation, however, a difference could be detected when light fell on the work in a certain direction, under which conditions one side showed more gloss than the other. Straightness, flatness and smoothness to the touch were exactly the same for both sides, notwithstanding that one cutter had one tooth only and the other fourteen teeth. Though it is not recommended here to use cutters with one tooth only for finishing, the foregoing test shows plainly that there is no merit in fine spacing. Attention is again called to the fact that even though the finish on a single piece might be better with more teeth in action, the average finish for an entire lot of pieces is better with less teeth.

#### Comparison of Old Style and New Style End Mills

Figs. 4, 5 and 6 show the end mills which are now considered standard by the Cincinnati Milling Machine Company and which fill practically all requirements. They are made in sizes of 1 in.,  $1\frac{1}{4}$  in.,  $1\frac{1}{2}$  in. and 2 in. in diameter, the smallest with four and the largest with eight teeth. It will be noticed that in order to preserve the strength of the teeth it is necessary to mill the back of the teeth of the three smaller sizes with two faces. A number of tests have been made with these cutters, but no comparative tests as to power consumption. Their action is remarkably free. This was clearly demonstrated by the following experiment: A 2-in. taper shank end mill milled a slot  $1\frac{1}{16}$  in. deep in a solid block of cast iron at a rate of 6 in. per minute. The block was clamped to the table of the milling machine and the knee was fed upward. Under these conditions the chips did not free themselves from the cutter, but were carried around and ground up. The cutter was cutting over half its circumference. These two conditions combined make the task for the milling cutter about as difficult as is imaginable. There was, however, no sign of choking, and the power consumption was not higher than it would have been with a spiral mill under ordinary conditions. The same cutter would remove from the end of the casting a section  $1\frac{1}{2}$  in. wide and  $1\frac{1}{2}$  in. deep. Under those conditions the chips would free themselves from the cutter, and these chips were rolled up in pieces much like the chips obtained from a broad planer tool when taking a finishing cut. This cut was taken with a feed of 11 in. per minute. Another similar cut, but 1 in. by  $1\frac{1}{8}$  in. in section, was taken with a feed of 33 in. per minute. Similar though much lighter cuts were taken with ordinary end mills, and in the same piece of cast iron. Again the cast iron seemed to be very hard and became glossy when cut with an ordinary cutter, but appeared to be soft when cut with the wide-spaced cutter.

Face mills have also undergone a gradual evolution, and they are now used by the company and catalogued, though not made for use of customers. In Fig. 6 a new-type face mill is shown at the left and at the right a mill of the old or regular type.

However accurately a milling machine may be built the spindle is not exactly at right angles with the table. The amount of variation is very small in a properly built machine, but some exists and is likely to become greater when the machine wears. The result is that when feeding in one direction the leading teeth of the cutter dig deeper into the work, leaving the other side of the cutter entirely clear, but when feeding in the opposite direction the opposite takes place, which makes the teeth drag over the work. In order to provide the teeth with clearance the back end of the tooth is ground away at an angle of 3 to 5 deg., and there is a land of  $3/16$  in. only where the blade is straight.

It is the excess of width of the cutting blades which is liable to cause chatter, which, strange as it may seem, is more pronounced with a light than with a heavy cut, because the tooth does not enter the work, but tries to ride over it. When the cutter has been lifted sufficiently the pressure becomes great enough to make the blades enter.

This action causes a series of radial chatter marks, and is very much worse with wide blades than with narrow ones, and again, very much worse with a large number of blades than with a few. A  $3/16$ -in. land proved to be an acceptable compromise, as a wider land would quickly dull the cutter, even if it did not make a chatter mark, while a narrower land would have the tendency to produce a scratchy finish.

#### The New Helical Cutter

The new helical cutters developed by this company consist of a cylindrical body with two or three screw threads wound around it at an angle of 69 deg. with the axis. The diameter is  $3\frac{1}{2}$  in. and the lead of the helix  $4\frac{1}{4}$  in. They are made in two styles, either single or as interlocking right and left hand cutters. They are made with a rake of 15 deg. and clearance of 5 deg. when used for steel, and with a rake of 8 deg. and clearance of 7 deg. when used for cast iron. Their most distinguishing feature is that they push the chip off in the direction of the axis of the cutter, or at right angles to the feed. The power



Fig. 9.—A High Power Face Mill Roughing Vise Body Bottoms, One Piece Being Chucked While the Other Is Being Operated On.

consumption is extremely low for steel, but does not show up so favorably for cast iron. A roughing cut in steel requires only about one-third the power of an old-style spiral mill.

Another distinguishing feature is that this cutter does not make revolution marks, but tooth marks. As a result a much coarser feed can be used for finishing. A cutter with three teeth will allow of a finish three times as fast as an ordinary spiral mill. Still another feature of this cutter is the entire absence of spring in the arbor when cutting steel. It is possible to take a finishing cut over a piece of steel, then return the work under the cutter and let the cutter revolve any length of time without producing a mark.

It was originally thought that a single cutter of this description would do well for finishing, but not for roughing, on account of the excessive end pressure on the spindle and the interlocking cutter was made to obviate this end pressure. However, it was found that this end pressure, though perceptible, was no disturbing element. Cuts which required 80 amperes with the interlocking cutter required 85 amperes with the single cutter. In order to see if continued use of the single cutter would cause increasing friction at the spindle end, a great number of cuts were taken in as rapid succession as it was possible

to adjust the machine for the next cut. The fact that there is no spring in the arbor makes it possible to use the milling machine without braces in a great many cases where they would otherwise be needed.

The chips come from the work in the form of gimlets, the back of the chip being polished or burnished, and the surface of the work shows no sign of tearing of the metal. It was first believed that these cutters would work best at a high speed, but it was found that this was not the case. They produce the best results when run at the same number of revolutions as the ordinary spiral mill.

The writer believes that remarkably low-power consumption is due to what might be called virtual rake, which is an angle depending on the angle of rake and on the angle the thread or tooth makes with the axis. This virtual rake becomes a small angle when the actual rake is small, as is the case with the cutter used for steel, where the actual rake is 75 deg. Where, however, the angle of rake approaches 90 deg. the influence of the helix becomes very much less pronounced, and if the actual rake were 90 deg. the influence of the spirality would be zero; in other words, the virtual would equal the actual rake. This may explain why the saving in power consumption is not so pronounced when cutting cast iron. It is believed that this saving of power would be equally great with cast iron as with steel if the same virtual rake could be obtained, and this supposition was borne out by a few tests made on cast iron with a helical cutter ground for steel. The fact, however, that the edge of the cutter would not stand up made it impossible to extend the tests far enough to come to a safe conclusion.

Another reason which suggests itself to the writer as to why the helical cutter shows less saving in power on cast iron than on steel, is the result of a series of tests made on cast iron and steel with spiral mills with and without rake, the rake being in all cases 9 deg. These cutters showed improved efficiency for steel and cast iron, but much more for the first than for the latter. A cutting tool must detach the chip from the work, bend the chip and at least partially break it up. When cutting steel the radius of curvature of the chip becomes greater with increased rake and the extent to which the chip is broken up becomes less. Cast iron will stand much less bending before breaking, so that even with increased rake the chip is still broken up as before, and no saving in power can be effected in this part of the process.

#### Efficiency of Different Cutters

Fig. 8 is a diagram comparing the performance of different styles of cutters for different materials and the different depths of cut, with feeds of 4 in. per minute. It will be noticed that all lines are practically straight, with the exception of the line for the regular face mill when cutting machinery steel. This line makes a sharp turn, which is believed to be due to the fact that the blades of this face mill did not project far enough beyond the body. As cast-iron chips were crumbled up the effect was not noticeable for cast iron, but became quite important for machine steel. This diagram shows that for cutting cast iron the high-power face mill is the most efficient. Then comes the regular face mill, then the spiral mill with 1½-in. spacing, then the spiral mill with ¾-in., then the spiral mill with ½-in. spacing. The 5-in. and 3-in. end mills come last in efficiency. These mills are of the old type, with relatively fine spacing. The order of efficiency of the different cutters is somewhat different for machine steel. The helical mill comes first, then the high-power face mill, then the spiral mill with ¾-in. spacing (no tests were made with spiral mills with ½-in. and 1½-in. spacing on machine steel) and finally the regular face mill; but it should be noticed that if the curve for this mill had continued the way it started it would have been below the curve for a spiral mill.

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**Railroad Equipment Orders.**—The Seaboard Air Line has ordered 1,000 box cars, 200 phosphate cars and 30 caboose cars. The Pennsylvania Railroad Company will build 81 steel cars at Altoona. The Pere Marquette has placed 12 coaches and 2 combination cars with the Pullman Company. Locomotive orders include 16 for the Missouri, Kansas & Texas, 25 for the Seaboard Air Line and 10 for the B. & O. The Pennsylvania will build 77 locomotives at its Altoona shops, and the Norfolk & Western 12 Mikado locomotives at its shops.

## The Determination of Manganese in the Presence of Chromium

BY THOMAS C. WATTERS.\*

\*Chemist, Columbia Tool Steel Company, Chicago Heights, Ill.

The accurate determination of manganese in high speed and air hardening tool steel or in any alloy steel containing chromium has given the metallurgical chemist considerable trouble, both in the volumetric and color methods. This is due to the fact that in oxidizing the manganese to permanganic acid part of the chromium present is oxidized to chromate and has an action similar to that of the permanganate upon reducing agents used in volumetric determinations; and in the color method the yellow color of the chromate interferes with the pink produced by the manganese and destroys its accuracy. We are using a method in our laboratory, which is a combination of the Volhard and bismuthate methods and are inclined to think the application original.

Two grams of drillings are dissolved in 20 c.c.m. of sulphuric acid (1.2 sp.gr.), enough water being added from time to time to keep the iron sulphate in solution. The solution when complete is oxidized by adding 5 c.c.m. of nitric acid (1.32 sp.gr.) and then evaporated until fumes of sulphuric acid are given off and the carbonaceous matter is destroyed. Water to the amount of 100 c.c.m. is added and the solution of the ferric sulphate effected by boiling. The liquid and residue are washed into a graduated 500 c.c.m. flask and a solution of sodium carbonate added until the solution becomes dark in color and the precipitate formed by the addition of the carbonate dissolves with difficulty. An emulsion of zinc oxide and water is run into the flask a little at a time and the flask shaken after each addition until all the iron and chromium have been precipitated. The volume is then made up to 500 c.c.m. with water and the precipitate allowed to settle. Then 250 c.c.m. (equivalent to 1 gram of sample) of the supernatant liquid is decanted, following which come a dry filter and transfer to an Erlenmeyer flask.

The solution is acidified with 25 c.c.m. of nitric acid (1.32 sp.gr.) and one gram of sodium bismuthate is added. It is well to shake the flask for several minutes after the addition of the bismuthate and then allow the residue to settle for a few minutes, after which it is filtered through asbestos, the filter pump being used. The flask and filter are washed with water containing a little nitric acid until free from the pink color of the permanganic acid. The filtrate is transferred to a beaker and a measured volume of ferrous sulphate solution, in excess of the permanganic acid, is dropped into the solution to reduce it; its excess is titrated with a standard solution of potassium permanganate until a delicate pink color is obtained. The ferrous sulphate solution should be made equivalent in strength to the permanganate. The difference between the number of c.c.m. of ferrous sulphate solution added and the number of c.c.m. of permanganate used to titrate the excess will give the number of cubic centimeters of permanganate which are equivalent to the manganese in the steel. By multiplying the number of c.c.m. of permanganate found by its manganese value the weight of manganese in the sample is found.

A solution of convenient strength for steel of low manganese content is made by dissolving one gram of potassium permanganate to a litre of water. It is standardized in the usual way, either with iron wire or ammonium ferrous sulphate, to find its exact value per c.c.m. in iron. Its iron value multiplied by the factor 0.1968 gives its value in manganese.

The ferrous sulphate solution may be made of such a strength as exactly to equal the permanganate solution; or if not quite equal in value, a blank titrate is made and its value in c.c.m. of the permanganate solution found. Fifty c.c. of sulphuric acid to the litre will keep the ferrous sulphate from crystallizing out of solution.

I trust that this method of determining manganese in the presence of chromium may prove of value where it is desired to combine accuracy with reasonable speed.

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The Titusville Forge Company, Titusville, Pa., manufacturer of iron and steel forgings, making a specialty of hammer forgings, has recently installed a large forging press. The company's equipment is modern in every way, enabling it to contract on a large variety of work in quantities.

## Dry Air Blast at a British Furnace Plant

At the blast furnaces of the Brymbo Steel Company, Ltd., in North Wales, Great Britain, a refrigerating plant has been installed recently for furnishing dry air blast, the power being derived from the exhaust steam of the blowing engine. The London *Iron and Coal Trades Review* gives the following data concerning the absorption system used in refrigeration:

The essential elements of the system are shown diagrammatically in the illustration. Ordinary liquor ammonia is placed in the generator and heated by means of steam. The ammonia gas in solution is driven off by the heat of the steam and passes into the condenser, which may be either of the shell or atmospheric type, where it is cooled and liquefied. From here the liquid is allowed to escape into the evaporator, where it evaporates back into the gaseous form, producing intense cold, the gas so formed passing into the absorber. At the same time the liquor in the generator from which the ammonia gas is driven off, called "weak liquor," is allowed to escape slowly into the absorber, which is kept cool, and there it meets the gas coming from the evaporator and rapidly absorbs it. A strong solution of ammonia is thus formed, which is pumped back into the generator to be heated and the ammonia again driven off and used over again, the proc-

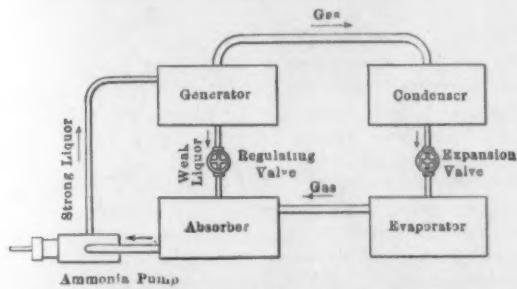


Diagram of Refrigerating Plant.

ess thus going on continuously. In practice, additions are made to the above with the object of increasing the efficiency of the apparatus. The ammonia gas, before entering the condenser, is made to pass through an analyzer and rectifier, where the water vapor is condensed and passed back into the generator. A heat economizer is also provided to cool the weak liquor before it enters the absorber, and at the same time heat the strong liquor before it enters the generator.

The evaporator may either be of the shell or continuous pipe coil type. In this the heat is abstracted from the air to be cooled, by evaporation of the anhydrous ammonia. The air is dried on its way to the blowing engine by drawing it over the cooling coils. In this way the moisture contained in the air is deposited and frozen on to the pipes. The frost is thawed off sections of the coils at regular intervals by the incoming air while the sections are cut off the machine. The use of brine is dispensed with, both for abstracting the heat and moisture and for thawing off purposes. The cost of maintaining the strength of brine by constant evaporation or by the frequent addition of calcium is also entirely avoided.

It is impossible at the present moment to determine the exact benefit of the recently installed plant, as it has not been long enough in operation, although the indications even now are most favorable. As far as the refrigerating plant is concerned, this has worked most successfully right from the start, the moisture in the air being kept constantly below 15 grains per cu. ft. The refrigerating machine has been working continuously with a steam pressure of only 1 lb. per sq. in. In many cases where the steam is at present passed into a condenser from a steam-driven plant, a much better result would probably be obtained by substituting one of these machines for the condenser and making use of the latent heat of the steam for refrigerating purposes. To work these machines with low-pressure steam very liberal surfaces have to be provided, and consequently the first cost is rather more than for certain makes of compression machines. As only a small liquor-circulating pump is required, apart from the water supply, they are almost without working or wearing parts. They are therefore specially suited for long continuous running, and by duplicating the ammonia pump

practically all the advantages of duplicating an entire compression machine are secured.

The suggestion sometimes made that absorption machines require more cooling water than compression machines is not correct if the latter are provided with an adequate supply of water. In some cases, however, when a proper water supply cannot be obtained, compression machines are fitted with ammonia condensers of the "evaporative" type, whereby the bulk of the water is used over again. By this means the condensers fulfil the double purpose of condensing the ammonia and re-cooling the water. The economy is, however, secured at the expense of greatly increased power required to drive the compressors, due to the higher temperature of the water going over the condensers. When it is desirable to economize the water separate water re-coolers are used, which cool the water much more effectively. The extra cost of this type of cooler is soon repaid by the saving in fuel consumption alone.

## The American Institute of Mining Engineers

Among the papers to be read at the one hundredth meeting of the American Institute of Mining Engineers, to be held at Glen Summit Springs Hotel, near Wilkes-Barre, Pa., June 6 to 9, are the following:

"Origin of Iron Ores of Central and Northeastern Cuba." By C. K. Leith and W. J. Mead, Madison, Wis.

"Occurrence, Origin and Character of the Surficial Iron Ores of Camaguey and Oriente Provinces, Cuba." By Arthur C. Spencer, Washington.

"The Mayari and Moa Iron-Ore Deposits in Cuba." By C. Willard Hayes, Washington.

"Exploration of Cuban Iron-Ore Deposits." By Dwight E. Woodbridge, Duluth, Minn.

"The Iron-Ore Deposits of the Moa District, Oriente Province, Island of Cuba." By Jennings S. Cox, Jr., Santiago de Cuba, Cuba.

"Characteristics and Origin of the Brown Iron Ores of Camaguey and Moa, Cuba." By Benjamin L. Miller and Willard L. Cummings, Bethlehem, Pa.

"The Fuel Efficiency of the Iron Blast Furnace." By John Jerman Porter, Cincinnati, Ohio.

"Briquetting Plant of the Lehigh Coal & Navigation Company." By Charles Dorrance, Jr., Lansford, Pa.

An informal meeting of members and friends of the institute was held at the United Engineering Society Building, 29 West Thirty-ninth street, New York, on the evening of May 8, at which Jennings S. Cox, Jr., general manager of the Spanish-American Iron Company, delivered a most interesting address on iron ore mining in Cuba, illustrated by a large number of photographs. The meeting was well attended, and President Charles Kirchhoff states that it is the intention to arrange for similar gatherings in the future, in order to promote a more active intercourse among the members of the institute.

## The Newark Foundrymen's Association

The Newark Foundrymen's Association, Newark, N. J., met on the evening of May 4 and after the usual dinner held its annual election, with the following result: President, Franklin Phillips, Hewes & Phillips Iron Works; vice-president, James Flockhart, Maher & Flockhart; secretary, Arthur E. Barlow, Barlow Foundry Company; treasurer, G. Hanney, Oscar Barnet Foundry Company; executive committee, James Flockhart, James Morrison, Morrison Foundry Company; Thomas Malcolm, Riverside Steel Casting Company; Louis Sacks, Star Heel Plate Company; S. M. Miller, Meeker Foundry Company. Mr. Hanney, who has served as treasurer of the association since its organization, and without compensation, was presented with a handsome scarf pin by his fellow members. After the election the members and their guests listened to an address by H. M. Lane, editor of *Castings*, on "The Action of Core Binders," which was illustrated by lantern slides and samples of his experiments.

The Champion Ice Machine Company, Springfield, Ill., has been incorporated with \$200,000 capital stock. It will manufacture ice machines for use in private residences, and will erect a factory but has not decided whether it will locate in Springfield or elsewhere. The machines will be manufactured under contract for the present. The company states that it will probably not be in the market for equipment until some time this fall. T. M. Dolan, of the Illinois Plumbing & Heating Company, is president of the company.

## Molding a Cone Pulley on an International Turn-Over Machine

By Employing It the Cost Was Materially Decreased

The molding of a cone pulley by machine is more difficult probably than is generally imagined, and for that reason the use for that purpose of a turn-over draw design molding machine built by the International Molding Machine Company 2300 South Western avenue, Chicago, Ill., is interesting. The machine was recently installed in

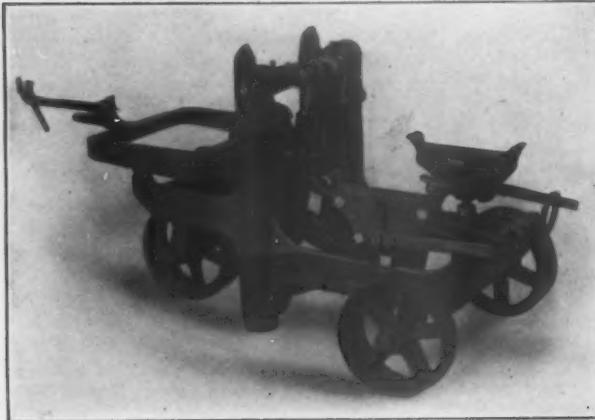


Fig. 1.—The Turn-Over Molding Machine Built by the International Molding Machine Company, Chicago, Ill.

the foundry of a large eastern builder of machine tools, and in making the pulley the mold was turned over on the receiving table and the pattern drawn up out of the mold. In this particular foundry especially good results have been secured with this pattern, and the cost of making the mold, it is stated, was reduced 62½ per cent.

Fig. 1 shows the machine before the pattern was mounted and Fig. 2 is a view of the machine after the pattern board, with the pattern attached, had been fastened to the turn-over frame. In Figs. 3 and 4 the next two stages in the preparation of the mold are illustrated, Fig. 3 being a view after the flask has been rammed up and clamped with the bottom board to the turn-over pattern frame, and in the other engraving the mold has been turned over and the pattern drawn. The position of the machine after the flask has been lifted out and the pattern frame swung back preparatory to making another mold is illustrated in Fig. 5.

The turn-over frame, which gives the machine its name, is mounted upon a horizontal steel shaft and revolves with it. Both ends of this shaft have heavy cast-

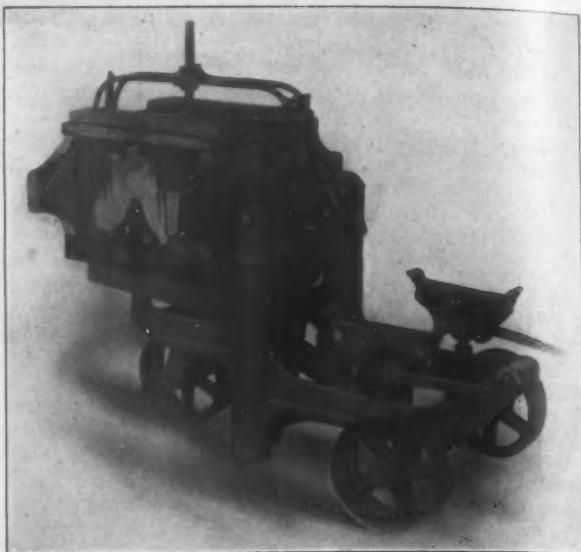


Fig. 3.—The Machine After the Flask Has Been Rammed.

quired for this work, the columns are drilled by a templet and have brass bushings extending their entire length, the diameter of these bushings corresponding exactly to that of the steel shafts which they engage. Pressing the foot lever, which is located in a convenient position in front of the machine, draws the pattern as illustrated in Fig. 4. Connection between this foot lever and the shaft supporting the turn-over frame is made by a heavy cast-iron crank and connecting rod.

The size and strength of the turn-over frame balance springs, together with the manner of attaching and fitting them, are calculated to secure perfect equalization of the leveling device. This equalization is secured by having four contact points, each acting independently of the other. This arrangement counterbalances the weight of the frame with the pattern board and the pattern, as shown in Fig. 5, and relieves the operator of exertion in turning the mold over.

The flask used for making this mold is of necessity a deep one from the shape of the pattern, and in designing the machine provision was made for this feature by locating the ramming bed close to the floor. As the pattern should be practically free from draft, it is necessary for the machine to draw the pattern in an absolutely straight line, and the way in which this is accomplished is shown in Figs. 3 and 4 by the change in the position of the pattern-carrying frame and the frame shaft and bearings.

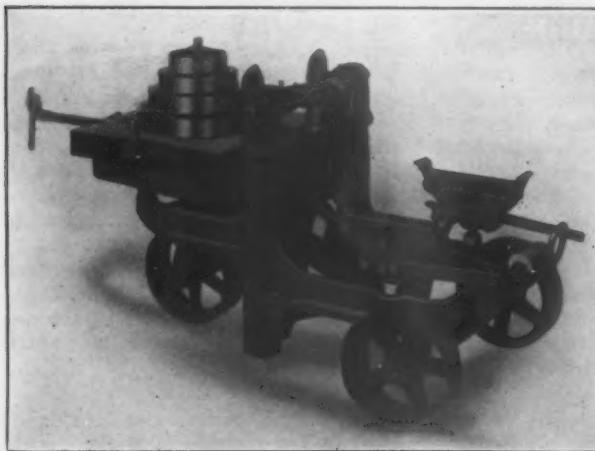


Fig. 2.—The Pattern Mounted on the Turn-Over Frame.

iron bearings with circular openings drilled in their under side. Parallel steel uprights are fastened into these openings and travel in the circular columns of the main frame of the machine, which control the action of the shaft raising the pattern frame. On account of the accuracy re-

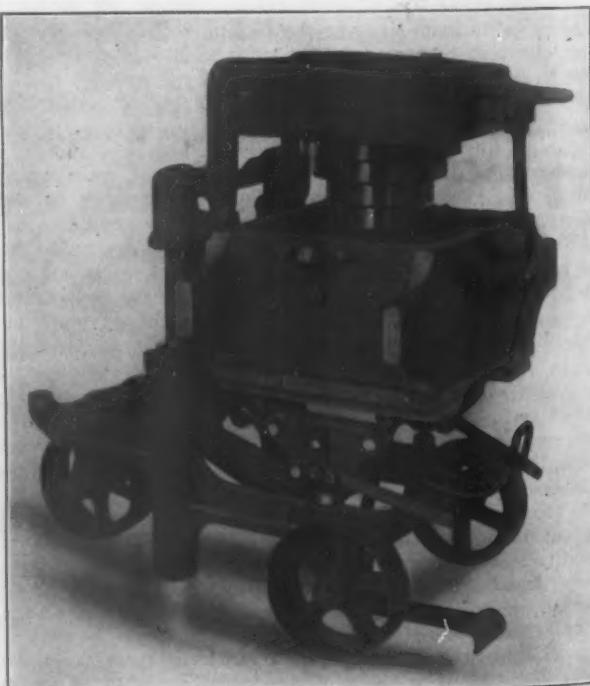


Fig. 4.—View Showing the Pattern Drawn from the Flask.

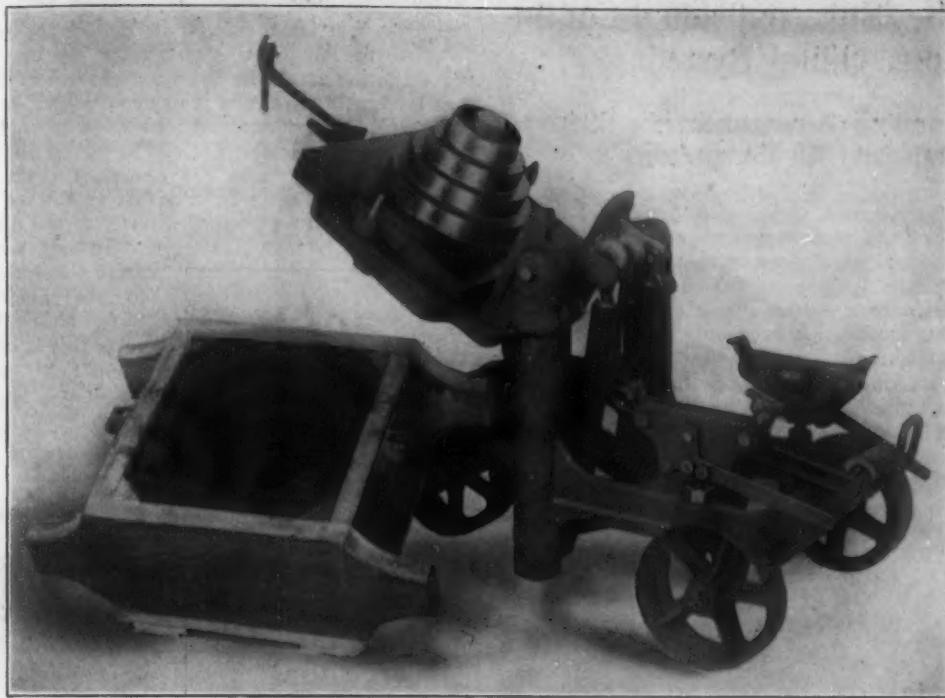


Fig. 5.—The Machine Ready to Make Another Mold.

### A New Henry & Wright Radial Drilling Machine

For driving drills that depend for their efficiency more on the speed at which the work is done than the rate of feed the Henry & Wright Mfg. Company, 111 Sheldon

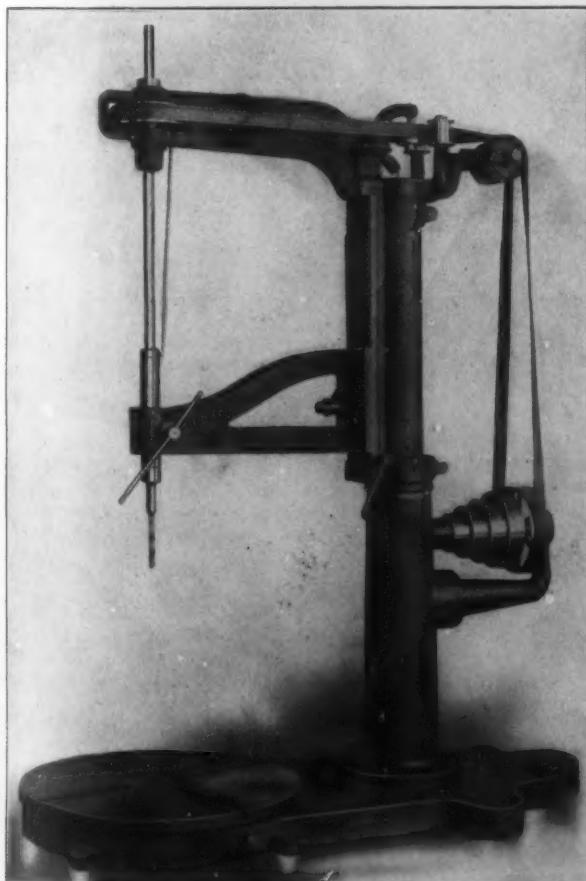
claimed, enables the operator to find any drilling position in a small fraction of the time required with the other types of machines.

The power supplied to a machine of this character has to be divided into two portions, one for rotating the drill and the other for feeding it into the work. For drills  $\frac{1}{2}$  in. in diameter or less it is emphasized that it is economical to divide the power so that the greater part is used in the first way. With a  $\frac{1}{2}$ -in. drill the power should be equally divided between the two, while above that point the power must be used in an increasingly greater proportion for feed and in a correspondingly less one in the form of speed. For this reason machines driving drills having larger diameters than  $\frac{1}{2}$  in. must be stiffer and heavier than those employed for driving the lighter ones, and are heavy, slow, expensive and inefficient, comparatively speaking, when using drills less than  $\frac{1}{2}$  in. in diameter.

The new radial drilling machine is driven by a 2-in. belt and is designed to drive drills up to  $1\frac{1}{8}$  in. in diameter. In this field it is claimed that the machine will be found much more efficient than the heavier machines, as the drills can be driven at a much greater speed than is possible with the more powerful machines, while at the same time only a fraction of the power consumed by the larger machines is used. Eight spindle speeds are available, and, in addition to drilling, the machine can be used to tap holes up to a maximum of  $\frac{1}{2}$  in. Ball bearings are employed throughout, including the swinging column, and both the column and the table are equipped with locking screws so that they may be kept in any desired position.

One of the special features of the spindle drive is that the driving pulley is located about midway of the column, instead of at the top. In this way a shorter and stiffer spindle can be used, and the spindle pulley is inclosed by a bracket to eliminate as far as possible all belt strains, except a rotary one, from reaching the spindles. The overhang of the arm is 30 in., but the table, which revolves on ball bearings, permits the operator to reach a point 60 in. from the column by swinging the table with his foot.

The equipment of the machine includes a countershaft with a clutch and sub-table for handling small parts.



A New Light High-Speed Radial Drilling Machine Built by the Henry & Wright Mfg. Company, Hartford, Conn.

street, Hartford, Conn., has designed a new light, high-speed, radial drilling machine. It has been found efficient for drilling bulky parts with the smaller sizes of drills, and crossing the arm with the circle of the table, it is

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has recently ordered four 9-retort Taylor gravity underfeed stokers to be used with four 800 h.p. boilers. They are to be installed in the Commerce street plant in which stoker experiments have been carried on for a long period.

## The White Star Individual-Continuous Oiling System

### A New Lubricating Arrangement for Engines, Pumps and Air Compressors

The Pittsburgh Gage & Supply Company, Pittsburgh, Pa., has developed and recently placed on the market the White Star individual-continuous oiling system. This arrangement is to meet the demand for an individual oiling system for use where a central oiling system cannot be operated advantageously or where only a single engine, pump or air compressor is installed. Two sizes of system are built, one of which provides for the lubrication of engines up to a maximum of 250 hp. and the other for engines ranging from that figure to 500 hp., the latter being the one illustrated in Fig. 1. Figs 2 and 3 show two of the special features of the system, the former being a sectional view of the filter while the latter illustrates the automatic drain tank.

The essential parts of the system are an oil filter, an automatic drain tank, a pump for circulating the oil through the system and the necessary sight feeds, tubing and compression fittings. The engine type of oil filter, a sectional view of which is given in Fig. 2, is cylindrical in form and is divided into two compartments with a removable cover. When the oil enters the filter from the drain tank it passes through the removable screen shown at the top and thence into the funnel at the right, which is located in the water compartment. The waste oil is thus discharged under water, and as it rises to the surface is freed from any sediment. After the oil has risen to the top it flows into the filtering chamber, where it passes through cloth wrapped around a cylindrical basket and emerges thoroughly cleansed and purified. This compartment of the filter has a large capacity for storing the purified oil until it is required for lubrication. The filter cylinder can be easily removed and cleaned without interrupting the use of the system. The filter is supported by a 4-ft. pipe pedestal at any convenient point on the engine frame, and the upper end of this pedestal screws into a 2-in. standard pipe flange on the bottom of the filter. Pedestals either longer or shorter than 4 ft. can be furnished if desired, but the customary height of the filter above the highest point to be lubricated is 12 in. The filter has faucets for drawing off the oil and for

draining the water which accumulates in it, as well as gauges to indicate the levels of the oil and the water.

After the oil passes through the bearings it flows by gravity to the automatic drain tank shown in Fig. 3, where the foreign matter and entrained water are removed. This tank has an automatic overflow for removing the accumulations of water, and can be placed on or below the engine room floor with the necessary drain and return connections leading to it. As fast as the oil rises to the top of the tank it is pumped directly to the filter.

In use, the oil drains from the various bearings to the automatic drain tank, although in some cases this is omitted and a sump built in the engine foundation is employed instead. From either the sump or the drain tank

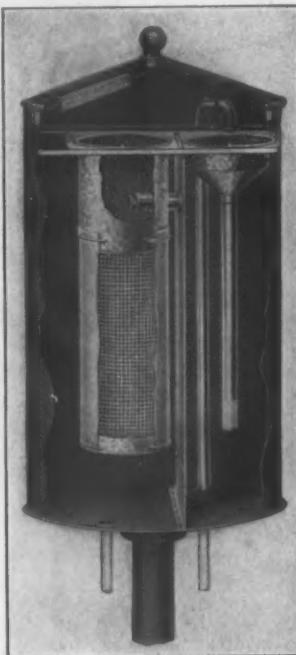


Fig. 2.—Sectional View of the Filter.  
Two of the Special Features of the System.



Fig. 3.—The Automatic Drain Tank.  
Two of the Special Features of the System.

the oil is forced by one of the customary types of pumps deriving its motion from some conveniently located part of the engine to the filter. After being filtered the oil flows by gravity through a system of piping to each point to be lubricated. At the bearings the lubricant is fed through the Gaco sight feed of the manu-

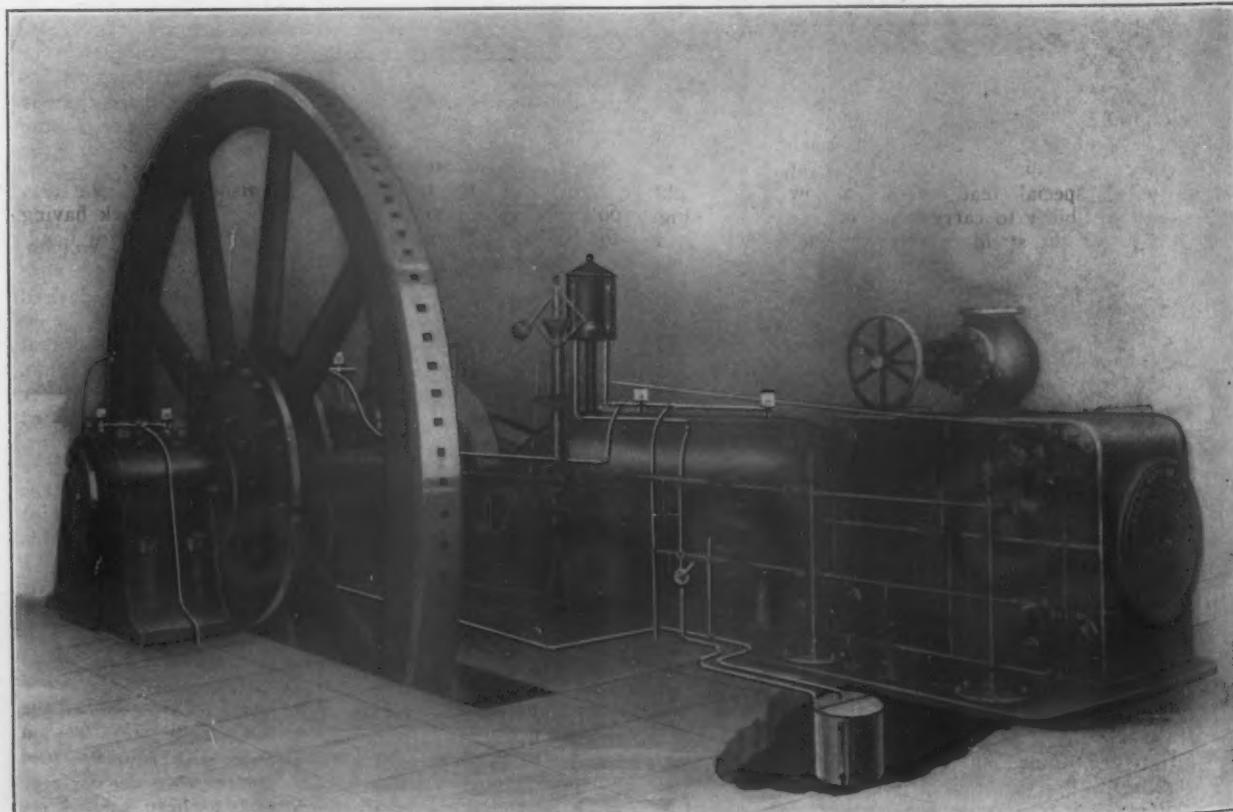


Fig. 1.—Corliss Engine Equipped with the White Star Individual-Continuous Oiling System, Made by the Pittsburgh Gage & Supply Company, Pittsburgh, Pa.

facturer which shows the rate at which the oil is being fed and is capable of being adjusted to regulate the feed. After the oil has lubricated the bearings it flows back to the sump or the automatic drain tank and is pumped back to the filter to be purified and used over again.

The piping connecting the various parts of the system can consist either of screwed fittings and threaded pipe or compression ells, tees, couplings and seamless steel tubing can be supplied by the manufacturer to make the connections between the filter, the drain tank, the pump and the sight feeds. If the latter are used the entire system can be easily and quickly connected without threading, soldering or expanding the ends of the tubing, as it is only necessary to cut the tubing and tighten the compression couplings, when tight joints are quickly made. The annealed seamless steel tubing supplied can be readily bent to conform to the frame of the engine and adds to the appearance of the system. As special tools are not required to erect the system it is not necessary to employ an experienced pipe fitter, and the work can be done very quickly.

### Automatic Electric Freight Truck

Under patents recently granted William C. Carr, the Automatic Transportation Company, 2933 Main street, Buffalo, N. Y., is manufacturing a new type of electric truck. While this vehicle is primarily designed for handling package freight at railroad and steamship terminals, it can nevertheless be used in industrial estab-



Fig. 1.—The Standard Electric Freight Truck Built by the Automatic Transportation Company, Buffalo, N. Y.

lishments where packages, cases and machine parts or machines, not exceeding 4,000 lb. in weight, have to be handled. The special features are a low body, light weight and the ability to carry loads up any grade. Fig. 1 is the view of the standard truck in use, while Fig. 2 shows the end gate lowered to increase the amount of loading space. The arrangement of the driving mechanism is clearly illustrated in Fig. 3.

The truck can be readily operated by unskilled laborers from either end and in either direction, is easily controlled and can be turned in very small space. The storage batteries contained in the steel receptacle on one end of the truck supply the power for operating. The controller is located beneath the battery box and is attached

to the truck frame while the motor is located in the center as shown in Fig. 3. At the other end of the truck is a movable gate, hinged at the bottom, which can be lowered to increase the available loading space as illustrated in Fig. 2. The platform is supported by springs mounted on the axles, and the wheels also have rubber tires to make the operation of the truck both easy and noiseless.

The two handles and the foot lever shown in Figs. 2 and 3 control the movement of the truck in either direction and from side to side. One of these handles controls the movement of the truck in a straight line, and the other reverses the controller. The foot treadle, which is located a few inches above the step, controls the application of the power by opening and closing the motor supply circuit and at the same time releases the brake. When pressure is removed from the treadle, the current is instantly cut off and the brake set. When the brake has been set, the motor circuit cannot be closed until the

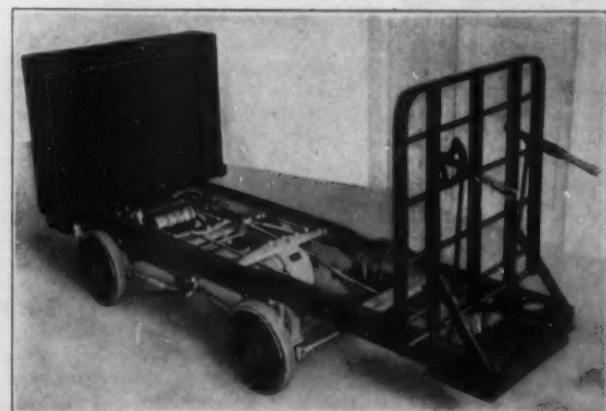


Fig. 3.—View Showing the Arrangement of the Driving Mechanism.

brake is released. These controlling devices are all interlocked so that when it is desired to reverse the direction of the car the brake must be applied and the car brought to a standstill before the direction can be changed and the current again turned on.

The following table gives the principal dimensions and specifications of the standard truck:

Width of loading platform (inches).....	45
Length of loading platform (inches).....	98
Length of loading platform with gate lowered (inches).....	125
Height of platform above floor (inches).....	20
Diameter of wheels (inches).....	16
Wheel base (inches).....	50
Tread (inches).....	36
Minimum load (pounds).....	2,000
Maximum load (pounds).....	4,000
Minimum speed (miles per hour).....	2
Maximum speed (miles per hour).....	10
Weight, including batteries (pounds).....	1,800

If desired the truck can be furnished with a platform 60 in. wide and 36 in. from the floor. The truck having the higher platform is designed more especially for handling mail, express and baggage from a regular car.

The Kane Blind & Screen Company, Kane, Pa., whose plant was destroyed by fire about a year ago, has just completed its new factory. The main building is of brick and timber construction, 60 x 150 ft., two stories. It is equipped throughout with modern woodworking machinery, electrically operated, for the manufacture of rust-proof doors and window fly screens, inside sliding blinds, etc. The capacity is considerably larger than that of the burned plant. W. S. Calderwood is president of the company, D. J. Gampp is secretary, and E. H. Watkins, treasurer.

The Aetna Foundry & Machine Company, Warren, Ohio, general founder and machinist, has some important contracts on hand, among which are all the fittings complete for two new blast-furnace stoves for the Thomas Iron Company, Milwaukee, Wis., and the contract for the operating machinery for locks for one of the new dams on the Ohio River for the United States Government. The company is also building a slab transfer from furnaces to mills for the new plant of the American Sheet & Tin Plate Company, at Gary, Ind.

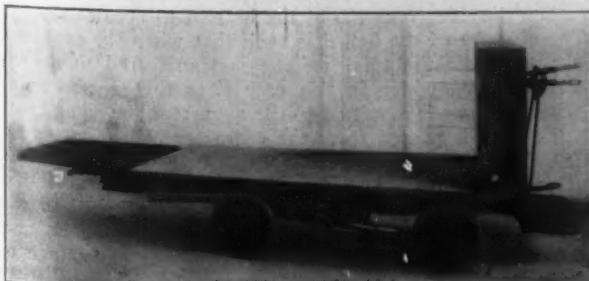


Fig. 2.—The Truck with End Gate Lowered to Increase the Loading Space.

## The Precision Simmance-Abady CO<sub>2</sub> Recorder

### A New Automatic Instrument for Recording the Thoroughness of Combustion

The Precision Instrument Company, 49 Larned street W., Detroit, Mich., is manufacturing under the Simmance-Abady patents a line of automatic recorders for indicating the percentage of carbon dioxide produced in the combustion of coal. These instruments are made in a number of different types for disk, drum and tape records for various periods of time. All of these instruments have practically the same dimensions and the same general appearance. Fig. 1 is a view of one of the recorders, while Fig. 2 shows the details of its construction.

Cast iron painted in dark colors is generally used in the construction of the cases, although if desired steel or wood can be substituted, and the metal parts showing through the glass door are made of polished brass. The recorder is not affected by outside conditions and can be placed in the location which is most convenient for the fireman to see regardless of whether the place is hot, dusty or drafty. The construction of the instrument is very simple and there is nothing to get out of order and no glass vessels to break. It can be used on boilers with either forced, induced or natural draft and will draw flue gas continuously from one end of the year to the other.

Referring to Fig. 2, which gives some details of the recorder's construction, the principal parts with the exception of the pen movement, which is not shown, are a siphon tank and float, an extractor tank and bell, a recorder tank and counterbalanced bell, a balance valve, a vessel for containing the caustic potash and gas and water supply connections. A small stream of water is the motive power for producing the cycle of operations in the recorder. This stream flows through the hollow valve stem *e* to the small reservoir *k* which has a safety over-

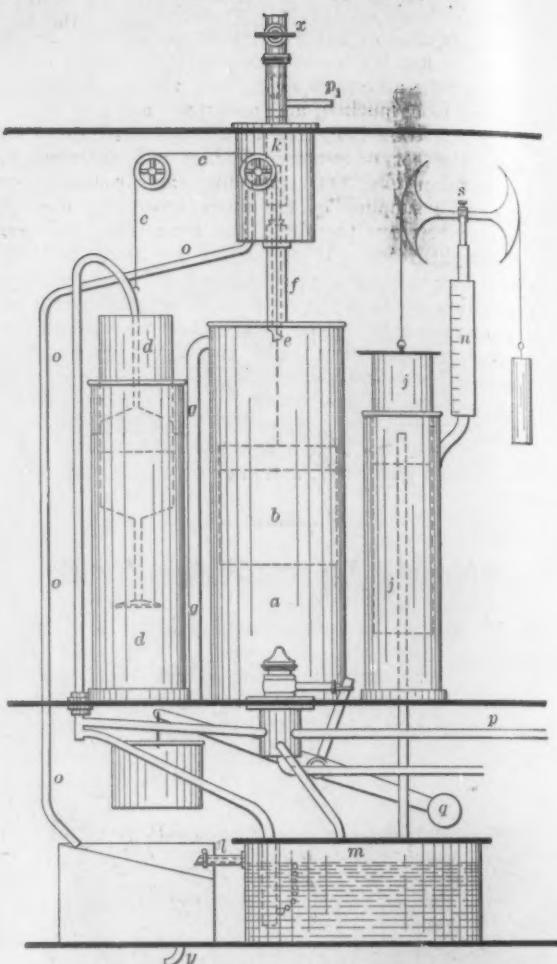


Fig. 2—View Giving Details of the Recorder.

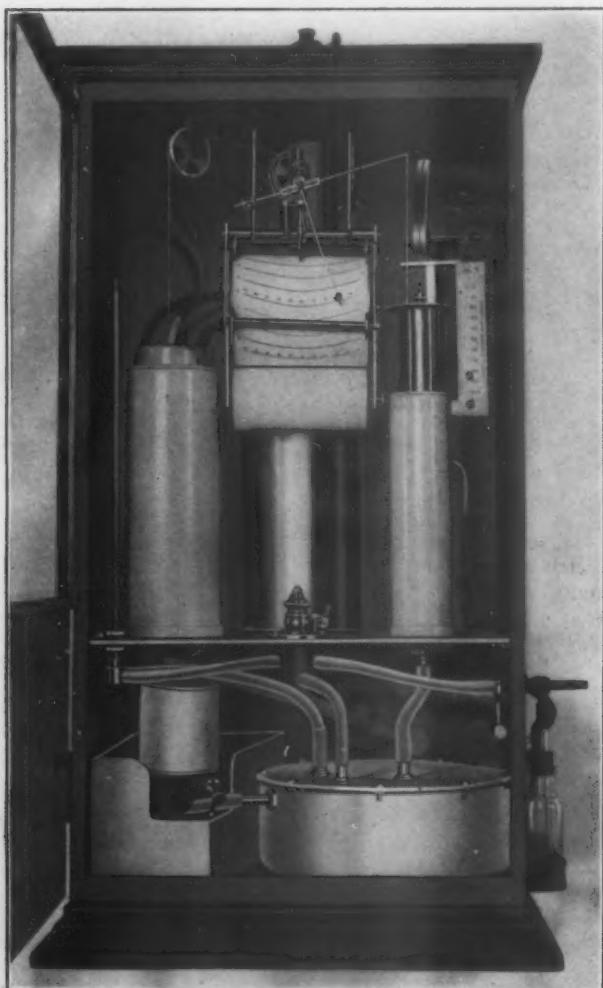


Fig. 1—The Precision CO<sub>2</sub> Recorder Manufactured Under the Simmance-Abady Patents by the Precision Instrument Company, Detroit, Mich.

flow, *o*. A weighted float, *b*, in the siphon tank *a* is attached by a chain, *c*, to the bell *d* of the extractor. As this float rises with the water the valve falls. When the float reaches the top of its stroke it raises the valve stem *e* and trips the valve. This flushes the siphon tank momentarily and the water siphons out of it through the siphon tube *g*. This permits the weighted float to fall and as it does so the water sealed extractor bell *d* is drawn up. A partial vacuum has been created in this bell and gas flows into it from the flue through the gas connection *p* and the balance valve *h*. This point may be considered as the beginning of the cycle. The weight of the water which has passed through the siphon tube *g* into the small receptacle beneath it now overcomes the weight of the balance weight *q* and closes the valve *h*, thus cutting off a definite sample of the gas. Water is then released from this small receptacle in time to permit the valve to open at the proper interval. As the stream of water is continually flowing into the tank *a*, the float *b* again rises and causes the extractor bell *d* to sink. As this takes place the gas in the bell, which since the valve *h* has closed is not influenced by vacuum or other conditions in the flue, is first reduced to atmospheric pressure. It is then put under actual pressure and is next forced into the caustic potash vessel *m* where it bubbles up through the solution and the CO<sub>2</sub> is absorbed. The gas then passes on into the recorder bell *j* and raises the bell. The boxwood scale *n* at the side of the recorder tank is graduated in percentages of carbon dioxide from 100 at the bottom to zero at the top. The capacity of the bell *d* is such that when the apparatus is run on air the total volume is transferred to the recorder bell *j*, which in this case rises to the zero point. When flue gas is admitted to the apparatus the same quantity of gas is passed from the extractor bell *d*, but as the CO<sub>2</sub> is absorbed by the caustic potash in the vessel *m* the volume of the gas is reduced and the recorder bell will not rise to its full height. The bell *j* is allowed to rise automatically as far as it will and a pen marks its final position on the chart and this records the percentage of carbon dioxide in the gas being analyzed. The bell then discharges the analyzed gas through the valve *h* without coming in contact with the fresh charge of gas which is dealt with in the same way. The whole operation, includ-

ing the drawing forward of the flue gas, takes place automatically, the stream of water furnishing the power. To insure a constant supply of gas an aspirator,  $p$ , is attached to the top of the case below the valve  $x$ . This is an auxiliary gas connection to the aspirator from the main inlet pipe  $p$  and in this way the gas is exhausted from the pipes connecting the recorder to the boilers so that the successive samples analyzed by the instrument are from the boiler flue and are not stagnant gases in the pipes. The small stream of water which furnishes the motive power for the instrument is so connected at  $x$  that it operates the aspirator before it enters the upper tank  $k$  of the recorder and thus no extra water is used for this continuous pump.

As will be noticed from Fig. 1, an arm or lever which supports the pen at the zero point of the chart projects from behind the chart. This lever is supported from the interior of the top of the case and at its opposite end is a counterweight which is hung in the siphon tank  $a$ , Fig. 2, and is operated by the weighted float  $b$ . When the recorder bell  $j$  has reached the position indicating on the scale the percentage of carbon dioxide in the gas, the float in the siphon tank rises and operates the lever which withdraws its support from the pen arm. In this way the arm starts from zero and records on the chart the percentage of  $\text{CO}_2$  in the flue gas, the length of this line being limited by the position of a stop hanging from the arm and touching the disk of the recorder bell. Before the gas in the recorder bell is expelled the float in the siphon tank falls and the counterweight of the pen lever follows it and lifts the arm back to zero. The bearings upon which this arm works are hardened and gilded metal points and the quadrant arm supporting the recorder bell and its counterbalance are suspended in a like manner. The pen movement is of brass throughout and fine adjustments are provided in all directions.

In installing the recorder in connection with one or a number of boilers two pipes have to be run to it. One of these, a  $1\frac{1}{2}$ -in. gas pipe, runs from the flue, and the other furnishes a constant supply of clean water preferably from a ball valve cistern. Drainage for the waste water must be provided and the instrument can be set up in any convenient position where these connections can be made. To prevent the pipes from becoming choked by hot and dusty gases a simple method of filtering the flue gases before they enter the pipes has been devised. A header is run along the battery of boilers with a T opposite the sampling tubes from each boiler but having no valves. A small cast iron oil cup is screwed on each of these T's and a cap is dropped over it after a little lubricating oil has been poured into the cup, thus sealing it. A length of perforated iron pipe is inserted in each flue and on the end of these sampling tubes an oil sealed cup and cap are also screwed. This arrangement makes it possible to test the gas in any boiler. A filter filled with any convenient filtering material is placed in the oil cup on the boiler to be tested and after the cap has been removed the channel of the filter is also filled with oil. A piece of cheesecloth is next placed over the filtering material and the filter cover is then dropped on and sealed by the oil in the filter channel. A short length of pipe with an elbow and cover is attached to the filter cover and reaches the oil cup on the header. The cover on this length of pipe is inserted in the oil cup after the cap has been removed and in this way a perfect connection for the flue gas is secured which can be removed for cleaning the filter or for testing another boiler instantly.

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The McInnes Steel Company, Ltd., Corry, Pa., manufacturer of crucible tool steel in various grades, die blocks and steel forgings, such as crank shafts, etc., is operating to good capacity its different departments, and is erecting an addition to its machine shop,  $40 \times 40$  ft. As soon as business reaches the point where conditions warrant it the company will build quite an addition to its plant.

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The United States Brake Shoe Company reports business to be satisfactory when compared with that of other concerns in its line, its current business aggregating a good tonnage. The company contemplates making an addition to its Corry, Pa., plant, to be of steel frame and cement block construction,  $100 \times 100$  ft., to serve as increased space for its cleaning department.

## The Positive Improved Transmission Appliances

A new line of transmission appliances, which includes a special type of split wood rim pulley and a combined jaw and friction clutch, has been placed on the market by the Positive Clutch & Pulley Works, 30 Lansing street, Buffalo, N. Y. The special features claimed for the pulleys, one of which is illustrated in Fig. 1, are lightness, strength



Fig. 1.—A New Type of Wood Split Pulley Made by the Positive Clutch & Pulley Company, Buffalo, N. Y.

and durability, low windage and increased belt efficiency. The clutch which is shown in Fig. 2 utilizes the principles of both the jaw and the friction clutch.

The pulleys are of an entirely new design and are made in a number of sizes ranging from 10 in. in diameter with 3-in. face width to 120 in. in diameter and a 48-in. face. The construction is of the combination type, consisting of a wood rim built up of segments by a special process, cold drawn annealed steel tubing arms and a split malleable iron compression hub in which are inserted cast iron bushings. As compared with a wood pulley of the ordinary type, these new pulleys are lighter for the same diameter and are equally as strong and durable as a steel pulley while an increase of 50 per cent. in the efficiency of the belt contact is claimed.

The company's clutch, which is illustrated in Fig. 2, has been given the trade name of Positive and the essential im-

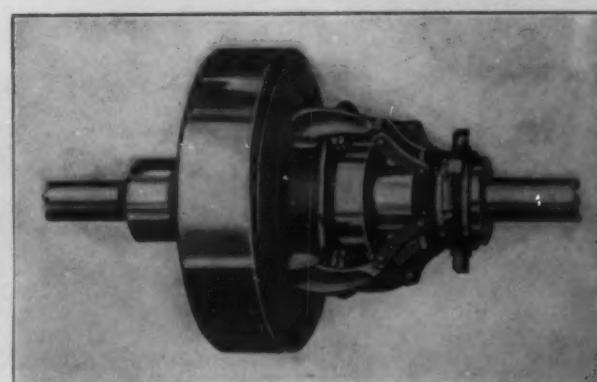


Fig. 2.—The Positive Combination Jaw and Friction Clutch.

provement in its design is the utilization of both the friction and the jaw principles. The design of this clutch enables it to be employed for coupling shafts running at any of the ordinary speeds as the friction portion of the clutch may be first thrown in and when the driven shaft has been brought up to the speed of the driver, the clutch can be converted into one of the jaw type without any loss of either time or power.

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Corrigan, McKinney & Co.'s blast furnace at Josephine, Pa., which has been out of blast for a number of weeks, will probably be started up in the near future.

Mechanical and Civil Engineers,  
PITTSBURGH, PA.

## A Very Large Dow Triplex Pump

What is said to be the largest triplex pump on the Pacific Coast was designed and built by the George E. Dow Pumping Engine Company, San Francisco, Cal. One of the special features of this pump, which was installed at the plant of the California Domestic Water

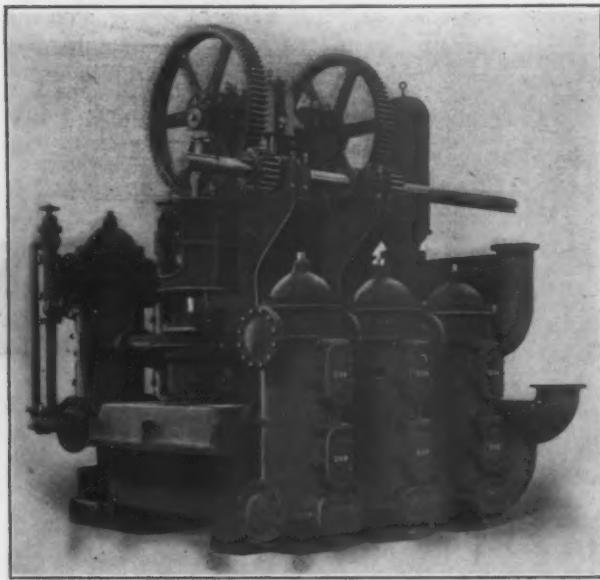


Fig. 1.—A 14x16 In. Double-Acting Triplex Pump, Operating Against a 250-Ft. Head, Built by the Geo. E. Dow Pumping Engine Company, San Francisco, Cal.

Company, Whittier, Cal., is its high mechanical efficiency. Fig. 1 is an exterior view of the pump, while Fig. 2, which is a sectional elevation, shows some of the constructional details.

The pump is of the double-acting type, having a capacity of 4,000,000 gal. per day when pumping against a total head of 250 ft. The cylinders measure 14 x 16 in. and the valves are of an improved design having a piston area of 100 per cent. and a very short lift. This arrangement is to allow the pump to be operated at a higher speed than is customary with triplex pumps, since the water passages are of the full area and the valves seat quickly. Hydraulic leather is used for facing the valves, and, as there is only a short movement in seating, they do not, it is found, strike the seat with destructive force,

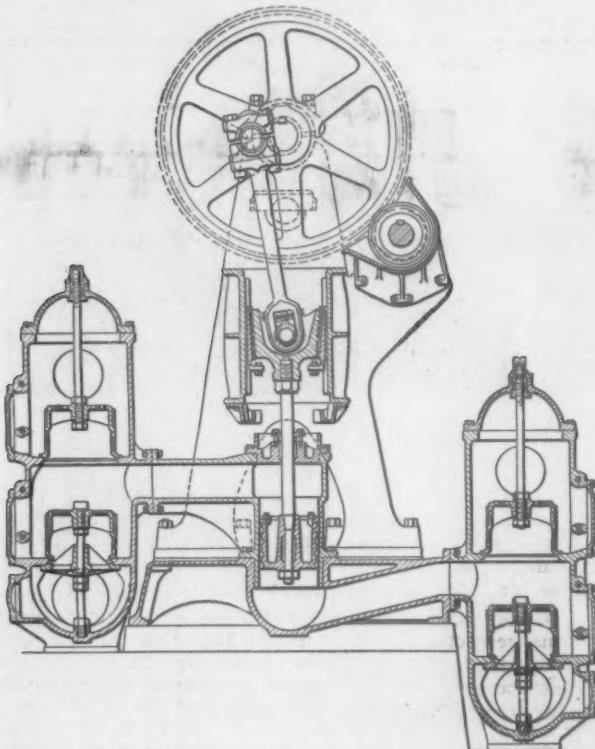


Fig. 2.—A Sectional Elevation of the Pump.

and thus long life is greatly favored. Another thing which tends to secure long life for the pump is the use of large air chambers on both the suction and the discharge, with the result that water hammer is almost entirely eliminated and an even discharge and suction are secured.

The pump is driven by a tandem compound engine having Corliss valve gear, which is directly connected to the extended shaft shown in Fig. 1. A mechanical efficiency of slightly more than 90 per cent. is secured, it is explained, a figure which compares favorably with that of the costly high duty crank and flywheel pumping engine. On account of the high efficiency, the pump is regarded as filling the demand for units combining large capacity and high efficiency.

## Customs Decisions

### Automobile Parts

The Board of United States General Appraisers has sustained in part claims filed by Harrison Bros. & Richardson, the Packard Motor Car Company regarding the classification of certain parts of automobiles under the tariff act of 1909. The merchandise consisted of magneto coils or windings, magneto coil condensers and distributor shaft arms, all of which were returned for duty under paragraph 141 at the rate of 45 per cent. on the value of the goods.

The importers alleged in their protests that the windings are dutiable properly at 40 per cent. as articles composed wholly or in chief value of wire. The condensers are claimed dutiable at 10 cents per pound and 20 per cent. ad valorem under paragraph 91 as manufactures of which mica is the component material of chief value, while the distributor shafts are alleged to be dutiable at 35 per cent. as manufactures in chief value of rubber. All of the rates claimed are lower than those assessed by the collector of customs at New York.

It appears from the official record that the windings and the condensers are of the same character as the articles passed on by the board in an earlier case, while it is held that the distributor shaft arm is an essential part of the magnetos used in motors of the explosive type. The decision by General Appraiser Fischer holds that the distributor shaft arms are in chief value of hard rubber. In sustaining the claims filed it is held that the collector's classification of the articles as "parts of automobiles" was erroneous.

### Jute Machinery Parts

The Chelsea Fibre Mills and the Allentown Spinning Company have been unsuccessful before the board in a controversy regarding the classification of metal parts for jute machinery. The goods are invoiced as "fallers without gills for push bar drawing frames" or as "spindles or flyers" or as "steel pins." The collector at New York assessed duty either at 45 per cent. as manufactures in chief value of metal or at 40 per cent. as manufactures of round steel wire, under provisions of the present tariff act. The importers alleged the articles to be dutiable properly at 30 per cent. under paragraph 197, as jute manufacturing machinery. General Appraiser Fischer states in his decision that the articles in question are a number of similar individual parts intended to be used as repair parts for jute manufacturing machinery and are of such a character that it is impossible to sustain the importers' contention, the collector's classification being affirmed.

The Follansbee Brothers Company, Pittsburg, Pa., with mills at Follansbee, W. Va., manufacturer of bright and terne plates and black and galvanized sheets, has received so many requests, especially from the roofers, for its publication known as *Tin Truth Bulletin* that it has decided to send all the roofers and metal workers in the United States this publication on the first and fifteenth of each month. It will also be sent to architects, while about 100,000 will be sent to owners of buildings throughout the United States.

The Chicago Pneumatic Tool Company, Chicago, will locate a plant at Chicago Heights, Ill., for the manufacture of Rockford gasoline railroad cars and commercial cars. The company has purchased an existing plant and will at once make such alterations as may be found necessary.

## Wire Cable Conveyor for Handling Kegs

A wire cable conveyor, affording another instance of the special service obtainable in conveying systems, was recently installed at the works of the Youngstown Sheet & Tube Company, Youngstown, Ohio, for carrying empty kegs from the cooperage plant to the rod and



Wire Cable Conveyor Bridge Built by the Jeffrey Mfg. Company, Columbus, Ohio.

wire department of the works. Formerly it was necessary to carry the empty kegs by hand into cars of the cooperage plant and transfer them to the packing room some distance away. This was a slow and expensive proposition and the conveying system, an insight into which may be obtained from the accompanying illustrations, was accordingly instilled by the Jeffrey Mfg. Company, maker of elevating, conveying and mining machinery, Columbus, Ohio.

One of the views shows the cooperage plant in the distance and the light steel bridge on which the conveyor is mounted, extending a horizontal distance of 140 ft. from the cooperage plant to the rod and wire department. The inclined portion of the conveyor leading upward from the cooperage house makes the entire length of the conveyor 152 ft. between centers. At the delivery end of the conveyor is located a gravity discharge chute of the special construction indicated in the second of the views. The conveyor is driven by a 3½-hp. motor and travels at a rate of 60 ft. per minute, giving the conveyor a capacity of 9600 empty kegs for an 8-hr. day.

In writing to the Jeffrey Mfg. Company, Mr. Robinson, second vice-president of the Youngstown Sheet & Tube Company, stated that by the use of the conveyor the company is able in about two hours' time to transfer sufficient kegs to keep the mail department supplied for 24 hrs. He added that the kegs are handled with less breakage and are deposited right where it is desired to use them. Incidentally it may be mentioned that the conveyor is equipped with an automatic counter which gives an accurate account of the number of kegs transferred from one to the other department.

The New Haven Machine Screw Company, manufacturer of screw machine products, New Haven, Conn., which has been in existence four years as a partnership, was incorporated May 2. Officers were elected as follows: J. J. Reidy, president; Pierrepont B. Foster, treasurer; D. F. Reidy, secretary. President Reidy has had 21 years' experience in the machine screw business. Treasurer Foster is a banker, being a director of the Yale National Bank, New Haven. The company will greatly increase the capacity of its plant. It has already placed orders for a considerable part of the new machinery required for the enlargement of the equipment.

H. C. Tatum will establish a broom factory at Blessing, Texas.

## New Interests in Baldwin Locomotive Works

The Baldwin Locomotive Works, Philadelphia, Pa., announced officially May 3, after refusing for several days to discuss reports that some plan of reorganization of its ownership was under way: "At a meeting of its directors and stockholders, held to-day, it was decided to reconstruct the present close corporation in such a way as to admit new interests into the organization. No change, however, in policy or management is contemplated. The business has long been one of the standard industries of Philadelphia, and the same principles of management, which have built up its present proportions, and have always yielded adequate profit, will continue to prevail. Drexel & Co., Philadelphia, and White, Weed & Co., New York, will act as bankers in connection with the matter." It is stated that a month will elapse before the matter will be definitely settled.

The Baldwin Works has just received orders for 10 heavy combination locomotives and five yard engines from the Seaboard Air Line, but there is little work ahead, and under the present buying policy of the railroads the outlook for any great activity during the summer months is not particularly bright.

## Remarkable Records at Ensley Furnaces

The No. 2 and No. 3 Ensley furnaces of the Tennessee



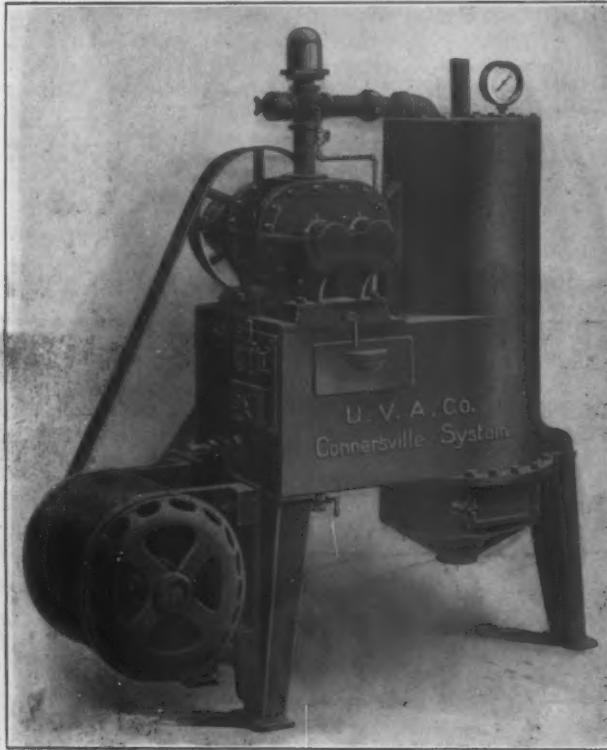
Delivery End of Jeffrey Conveyor in Rod and Wire Department of the Youngstown Sheet & Tube Company, Youngstown, Ohio.

Coal, Iron & Railroad Company have been making records for a good many months that have attracted attention widely. All these records were exceeded in April, when the No. 3 furnace produced 13,983 tons and the No. 2 furnace 13,555 tons, a daily average of 466 tons and 452 tons respectively. It is stated that this result was accomplished on the regular basic ore mixture of these furnaces and was not secured by unusual scrap additions. The fuel consumption averaged 2238 lb. to the ton of pig iron.

## Connersville Blower Applied to Vacuum Cleaning

A new type of vacuum cleaner for residences and small office buildings, where all the dust can be conveyed to a single receptacle in the basement, has been brought out by the United Vacuum Appliance Company, Connersville, Ind. As will be noted, the outfit consists of a motor, a vacuum pump and a separator tank all compactly grouped on a single base. The vacuum is produced by a standard rotary blower of the Connersville type which has been in use for many years for pumping gases and for removing the air from condensers and doing similar work, and its application to vacuum cleaning systems is taken as a logical development.

In operation the air and the dirt from the house piping system enter the top of the tank and pass through a pipe which is immersed in water. In this way the entrained air is allowed to filter out, but all the dirt is caught by the water and held in suspension until the



A New Type of Vacuum Cleaner Made by the United Vacuum Appliance Company, Connersville, Ind.

motor is stopped, when the dirty water is automatically discharged into the sewer. When the motor is started again, the separator tank receives a fresh supply of water automatically. About 6 or 8 gal. is required for each filling of the tank, and this arrangement insures that only clean air will be used by the pump. In this way the wear and tear due to entrained foreign matter passing through the pump, it is held, is eliminated. The air is then carried to the chimney or other vent. The sewer and water connections can be dispensed with if desired and a canvas screen separator which catches the dirt in a galvanized iron receiver that is afterward emptied by the operator substituted.

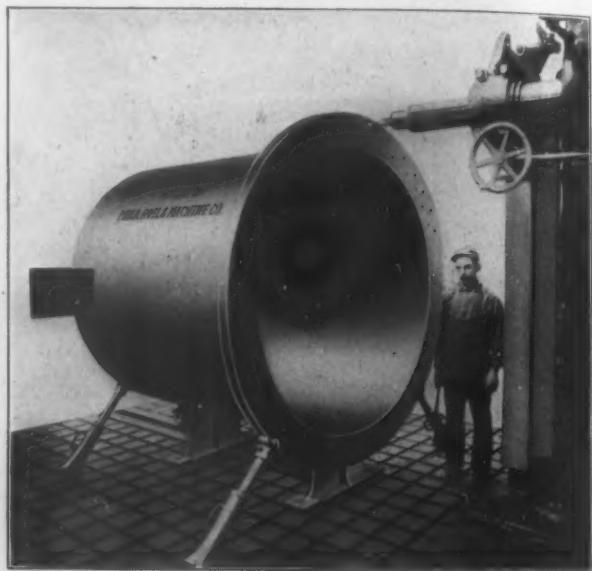
The construction of the pump used in this unit is simple. The part consists of a shell and two revolving impellers, with no valves or complicated parts. The bearings have oil wells and ring oiling devices so that the only attention required by the outfit is an occasional filling of the oil reservoirs. A vertically hinged frame is used to mount the motor, and the proper belt tension is secured by a few turns of a set screw. The starting mechanism is conveniently grouped on the unit as illustrated, needing merely the wiring to the motor when the unit is installed.

Forty of the largest mines are said to be producing copper at a cost of about nine cents a pound.

## A Huge Cast Iron Still

The Philadelphia Roll & Machine Company, Philadelphia, Pa., has recently completed a very large and interesting charcoal iron air furnace casting. A special heat resisting mixture of iron was employed for the casting, which will be used as a still for the ingredients entering into the manufacture of paint, lead and chemicals.

The casting, which was made in a loam mold, weighed



A 6-Ft. Cast-Iron Still Made by the Philadelphia Roll & Machine Company, Philadelphia, Pa.

about 12,000 lb. in the rough state and forms the body of the still. The metal of the casting is 2 in. thick except in the flange, where it is  $\frac{1}{2}$  in. thicker, and the internal diameter and the depth are 6 ft. The bottom of the still in this case was also made of  $2\frac{1}{2}$ -in. charcoal iron, although in some cases cast steel is employed instead. The bottom is slightly dished and is bolted to the flange, which has first been accurately machined with 132  $\frac{3}{4}$ -in. bolts. When the photograph from which the engraving was made was taken, these holes were being drilled. A manhole and an outlet for the distilled products are located in the top of the still, which is the farther end in the engraving. When repairs to the bottom of the still have to be made or the entire bottom renewed the body of the still is jacked up on the lugs at the rear.

**The General Electric Company.**—Arrangements for the conversion of the General Electric Company's \$12,875,000 5 per cent. 10-year gold debenture bonds of 1907 into stock have been made. The bonds are convertible into stock at par after June 1 next. The capital stock of the company as of December 31 last was \$65,179,600. Provided all the bonds are converted, the capital stock will then amount to \$78,054,600. With the conversion of all the bonds, the General Electric Company would have no bonded debt, with the exception of \$2,047,000 3 $\frac{1}{2}$  per cent. gold debenture 30-year convertibles of 1892. There are authorized and available, but not yet issued, \$1,912,066 5 per cent. bonds. The company's business is running at the rate of about 85 per cent. of what it was last year, in which year sales aggregated the record-breaking total of \$71,478,000.

**The Cutler-Hammer Mfg. Company** announces the establishment of a new department to be devoted to the design and manufacture of electrical appliances for industrial heating. The company's New York City factory at 144th street and Southern boulevard will be devoted principally to the manufacture of this class of apparatus, under the direct supervision of W. S. Hadaway, Jr., who for many years has specialized on applications of electric heat to industrial purposes.

Adrian Furnace Company blew out its furnace at Du Bois, Pa., May 1 and it will remain out indefinitely.

## Pulleys with Cork Set in Faces

Patents have been recently secured by the American Pulley Company, 4200 Wissahickon avenue, Philadelphia, Pa., covering a method of applying cork insets to the faces of belt pulleys. The special advantages claimed for the use of this type of pulley are the elimination of practically all slip between the belt and the pulley face, and in general an increase of 50 per cent. in the amount of power transmitted. Fig. 1 gives a general idea of the construction of these pulleys, while Fig. 2 is a view of a portion of



Fig. 1.—A Steel Pulley with Cork Insets Made by the American Pulley Company, Philadelphia, Pa.

the rim and shows the way in which the corks are held in place.

In inserting these corks in the rim a series of circular depressions, having sufficient depth to partly shear the metal at these points but still leave enough to support the corks and prevent them from being pushed through the face of the rim, is made in the metal. For producing these depressions a special type of power press having an overhung ram and a horn to support the die is employed. After these depressions have been made in the rim the corks are forced into place by a special small press. This tool is operated by hand and has a lever and a special motion for securing considerable power at the ram with relatively little exertion by the operator. The diameter of these corks before they are placed in position in the face of the pulley is considerably larger than the diameter of the depressions into which they are forced. Before inserting the corks they are compressed and are forced into position in this condition. The compression is relieved

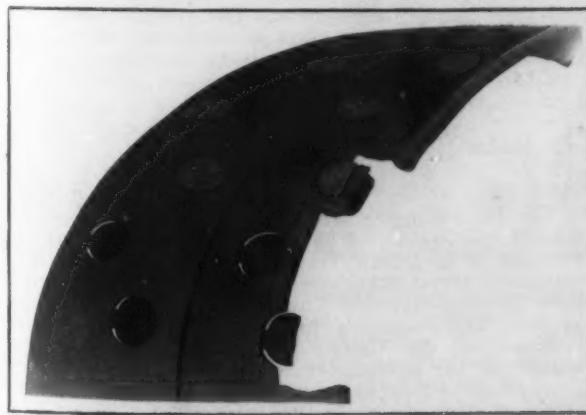


Fig. 2.—Portion of Rim Showing Manner of Inserting Cork.

after the corks are put in place, and they expand against the sides of these depressions and force themselves out between the sheared edges of these depressions and the rim face. In this way the corks become so tightly wedged in position that all danger of their coming out while in service is practically eliminated.

The line of pulleys made with these insets is the same as the company's regular line of steel split pulleys and ranges from 6 in. in diameter and a 2-in. face to 60 in. in diameter and a 36-in. face. If desired, these insets can also be furnished for the cast-iron and the wood-rim pulleys of this company.

## Rust-Proof Slag Paint

E. C. E. Lord, Office of Public Roads, United States Department of Agriculture, Washington, D. C., furnishes the following article to the *Engineering Record*:

For the last quarter of a century the waste products from iron blast furnaces and smelters have been used as paint pigments, either with a linseed-oil vehicle or mixed with oil of turpentine and bituminous compounds. Recent investigations carried on in the Office of Public Roads have indicated that certain varieties of slag resulting from the manufacture of steel by the basic open-hearth process, as commonly practiced in the United States, may be utilized as a rust-inhibitive pigment. Slags from basic open-hearth furnaces vary considerably in composition owing to frequent chemical changes in the metal bath during the process of refining, but the material suitable for an inhibitive-paint base may be readily recognized by anyone familiar with the manufacture of steel. It is a porous, brittle, dark brown or grayish brown cinder, having a specific gravity of about 3.30 and a dull, stony luster, in contradistinction to the darker, harder and more lustrous types which have little or no rust-preventive qualities.

Under the microscope the brown slag is characterized by the presence of colorless hexagonal crystals consisting chiefly of a calcium silicate containing an excess of lime in solid solution, and by dark brown cubical crystals containing the oxides of iron, manganese and magnesia. When ground to a proper degree of fineness and mixed with a suitable quantity of raw linseed oil, this slag forms a very quick drying paint of a metallic brown color, with excellent spreading properties.

It is well known that iron is rust-proof, in the presence of free lime or in a saturated solution of calcic hydrate, hence steel structures properly embedded in concrete will remain bright under ordinary conditions for a long period of time. The same is true of metal protected by basic open-hearth slag paint, where the excess of lime contained in the silicate component of the slag is partly liberated as hydrate by the action of moisture, and partly combines with the fatty acids of the oil to form difficultly soluble lime soaps. That is to say, the inhibitive properties of the basic slag paint in the presence of moisture is due to the liberation of calcic hydrate in conjunction with saponification of the oil vehicle. Experience has shown that this saponification, if allowed to proceed beyond a certain point, is injurious to the paint film, owing to the brittleness of the resulting soaps, and it would therefore appear necessary to apply this paint as a priming coat only and to cover the same as soon as possible after drying with a good protective paint of any desired color.

It would seem that the most practical and efficient method of reducing the slag to a proper degree of fineness would be to first pass the coarse material of the proper composition through an ordinary jaw stone crusher, and then convey the screenings (from  $\frac{1}{4}$  in. to dust) over an electro-magnetic field to a centrifugal grinder, and thence to the tube mill for final reduction, as is the common practice in the pulverization of Portland cement clinker; or the screenings, freed from their metallic iron content, may be readily ground to an impalpable powder in an ordinary pebble mill. About 6 lb. of this powder to 1 gal. of oil is the proper proportion for mixing the paint.

Experience only will determine to what extent this cheap slag dust may replace red lead and other expensive pigments, but its value as a base for priming coats on iron and steel seems to give great promise.

The annual meeting of the stockholders of the Crane Iron Works was held at its offices in Catasauqua, Pa., May 4. The present directors, Leonard Peckitt, James W. Fuller, Jr., J. S. Stillman, F. M. Jeffrey, C. H. Zehnder, A. A. Fowler and A. H. Brown, were re-elected. The officers also hold over as follows: President, Leonard Peckitt; vice-president, C. H. Zehnder; secretary, J. S. Stillman, and treasurer, H. S. Hart.

Sheridan Furnace, of the Berkshire Iron Works, Sheridan, Pa., was blown out May 4. The stack will be relined and other repairs made. The greater portion of the stock of pig iron on the yard is covered by orders in hand.

## The Machinery Markets

Foreign orders continue to contribute materially toward the support of the machinery market in a number of machinery selling centers. In New York current business is good, but new inquiries are not so plentiful as they were four weeks ago. In Chicago a fair volume of business is being done, and the outlook is encouraging, as the Santa Fé Railroad is reported to be about to close on a recently issued machine tool list and the trade there is bidding on the wood-working equipment required by the American Steel & Wire Company. A good order has been placed in the Chicago market for machine tools for delivery in Cuba and another consignment has been bought for a Spanish account. Business appears to be on the mend in Cincinnati, and reports from Cleveland indicate that inquiries in that market are increasing. The rebuilding of the destroyed section of Bangor, Me., is expected to bring out some good business in the New England market, and at present there is an excellent demand in that section for special machinery. The automobile industry is helping the machinery trade in Detroit, but the demand from other sources is somewhat light. A renewed call for logging equipment is looked for on the Pacific Coast, where at present sales of gas engines and pumps are occupying most attention. Inquiries are more plentiful in Philadelphia and the call for special machinery is good.

### New York

NEW YORK, MAY 10, 1911.

New inquiries are scarce, but machinery houses report that they are having better success in closing out business, as buyers of late are more prompt in placing orders after the bids are in. Some excellent business has been placed by the two automobile companies whose lists have been out for the last few weeks, and manufacturers in other lines who have been getting figures on small lots of tools have bought in such volume as to make the week's business a good one as far as orders are concerned. There seems to be a lack of new enterprises and extensions, however, so there is not as much business in sight as there was early last month. The Ontario & Western Railroad is disappointingly slow in closing out the large list it has had before the trade for many weeks past. The delay has been brought about, however, by the disposition on the part of some machinery houses to readjust their quotations, and in consequence new bids will be received on a great deal of the machinery the company intends purchasing. Manufacturers of power equipment are getting some good trade and inquiries for that class of equipment have increased of late. There is a good export demand, but manufacturers of mining equipment are losing some business as the result of the war in Mexico. New York houses have received a number of communications asking them to hold material ordered for delivery in Mexico until further notice.

The Prest-o-Lite Company, Indianapolis, Ind., and with offices at 2104 Broadway, New York, will build a brick and concrete factory at 786 Frelinghuysen avenue, Newark, N. J. The plans call for a one and two-story building, 98 x 102 ft., at an estimated cost of \$7,000, which will be equipped with special machinery for the repair of gas tanks and the filling of tanks with gas.

The Stevenson Engineering Company, 29 Broadway, New York, has plans prepared for a machine shop to be erected at Tottenville, S. I. The building will be 26 x 50 ft., one story, and will be equipped with the most modern machinery.

A work shop is to be built by the city of New York on the grounds of the Fordham Hospital, on Crotona avenue, in the Borough of the Bronx, which will be used as a repair shop for the Bellevue and allied hospitals. It is understood that later on mechanical equipment will be purchased to be installed in the shops.

A new plant is being built on Highland avenue, Niagara Falls, N. Y., by Fitzgerald & Bennie, electro-metallurgists, and will be used for experimental laboratory and furnace work.

The Graphic Art Company, Buffalo, N. Y., will build and equip a one-story brick addition, 60 x 150 ft., to its lithographing plant at Halbert street and the New York Central Railroad Belt Line.

The Wood Products Company, Buffalo, N. Y., has commenced the construction of a two-story brick building, 60 x 260 ft., at its wood alcohol plant at Fourth street and the Erie Canal, to replace a building recently destroyed by fire.

The Golden Furniture Company, Jamestown, N. Y., will at once rebuild its five-story factory which was partially destroyed by fire on May 6.

An addition, 88 x 110 ft., three stories, is to be made to the Huyck Mills, Albany, N. Y.

The Ewing American Motor Company has been incorporated at Ulster, N. Y., with a capital stock of \$1,500,000, and will establish a plant for the manufac-

ture of automobiles. The incorporators are C. A. Hamlin, A. P. Anderson and H. Gorham, Jr., New York City.

The Carter-Crume Company, with a large plant at Niagara Falls, N. Y., for the manufacture of triplicate salesbooks; the American Salesbook Company, Elmira, and the Eastern Salesbook Company, Glendale, Long Island, have been merged into the Carter-American Salesbook Company, with a capital stock of \$10,000,000. An enlargement of the Niagara Falls plant is contemplated.

The foundry, machine shop and storehouse buildings of the King Construction Company's plant, on Geneva street, North Tonawanda, N. Y., which were destroyed by fire May 3, are to be rebuilt at once. The company manufactures equipment for greenhouses, multiple window sash operating and controlling apparatus, etc.

The Bogart Gas Power Engineering Company, Buffalo, N. Y., has increased its capital stock from \$25,000 to \$100,000, for the purpose of enlarging its manufacturing facilities. The gas engines it manufactures in various sizes are now made under contract at Bradford, Pa.; Dayton, Ohio; Detroit, Mich., and Buffalo. The company's offices are in the Chamber of Commerce Building, in the latter city.

Burcroff & Shuman, Newark, N. Y., have been awarded the contract for construction of a boiler house for the New York State Custodial Asylum, at Newark, to cost \$18,000.

Bids are being received by W. P. Ginther, architect, Akron, Ohio, for a power plant and boiler house to be erected in connection with extensive new hospital buildings by St. Mary's Hospital, Niagara Falls, N. Y.

The Canadian Steel Foundries, Ltd., Welland, Ont., will shortly be in the market for rolling mill machinery and steel foundry equipment. The company is collecting catalogues on that class of machinery with a view to asking for bids.

### New England

BOSTON, MASS., May 9, 1911.

Several announcements of importance have characterized the week. The business of the George G. Prentice & Co., New Haven, Conn., manufacturers of automatic turret machines, has been purchased by the New Britain Machine Company, New Britain, Conn. William H. Farrell, a brother of James A. Farrell, president of the United States Steel Corporation, is organizing the Bridgeport Screw Company, Bridgeport, Conn., with a paid in capital stock of \$350,000 and will establish large works in that city. The General Electric Company will build a large extension to one of its Lynn buildings, and the Royal Typewriter Company, Hartford, Conn., will double its plant.

A broad inquiry among the machine tool builders of New England finds few exceptions to a condition of dullness. In some cases foreign orders are helping out in a large way, but the common experience is that shops are running with reduced forces. Special machinery is in good demand. The tap and die people of Greenfield seem to be busy and are making preparations for a large demand a little later. The rebuilding of the burned section of Bangor, Maine, should have some stimulating effect upon local business. Labor conditions are excellent. Outside of some isolated cases among the building and allied trades little unrest is evident. Certainly May day brought exceptionally few strikes, nor have

## THE MACHINERY MARKETS

manufacturers received word which could be termed threatening.

The notable transaction of the week in New England machine tool circles was the sale of the business of George G. Prentice & Co., New Haven, Conn., manufacturers of multi-spindle automatic turret machines, to the New Britain Machine Company, New Britain, Conn. The business will be moved to New Britain as soon as the new owner has completed a large building, the work of which will progress immediately. George G. Prentice, principal owner of the New Haven industry, is in poor health, which rendered it desirable that he give up the care of the business. He is the inventor of the machine and has manufactured it for something over 10 years, during which time many important developments and improvements have been made. The type has become well known abroad as well as in America. Its function is the machining, drilling and tapping of castings and forgings of any shape, the work being held in a revolving chuck, which is advanced and withdrawn from the spindles, and is indexed, with complete automatic motions, the only labor for the operator being the placing of the blank in the chuck, which has one section beyond the number of the spindles. The New Britain Machine Company manufactures a miscellaneous line of standard machinery and other metal products, as well as special work for other manufacturers. The Prentice machines will constitute an important addition to the company's products. The new building in which the department will be located will extend the present structure and will cover an area 56 x 130 ft. In the beginning the building will be five stories, conforming to the present building, but the construction will be such as to provide for two additional stories later. The Prentice concern employs about 200 hands.

The Bridgeport Screw Company, Bridgeport, Conn., is in process of organization under the leadership of William H. Farrell, recently Canadian representative of the United States Steel Corporation. W. H. Farrell is a brother of James A. Farrell, president of the United States Steel Corporation, but it is given out officially that the new company has no affiliation whatever with the large corporation. The purpose is to manufacture all sorts of wood and machine screws in their larger sizes, and also hardware and metal specialties. The company is incorporated in Connecticut, with a capital stock of \$500,000, of which \$350,000 will be paid in. In addition to W. H. Farrell the incorporators are Fred Enos, head of the Bridgeport Board of Trade, and Charles Stuart Canfield, a Bridgeport attorney. The two latter gentlemen are acting merely during the preliminary organization. A large piece of land has been purchased located between the tracks of the New York, New Haven & Hartford Railroad and Union and Central avenues and Williston street. A large factory will be built on the premises this season, according to the plans.

The General Electric Company, Lynn, Mass., has awarded the contract for an extension of one of the buildings of the River Works, Lynn, Mass., to be 80 x 360 ft., two stories.

The Royal Typewriter Company, Hartford, Conn., has let the contract for a factory building 50 x 130 ft., four stories, of brick, mill construction. The business is a young one and has grown with great rapidity until it has become necessary to practically double the capacity. Electric motors will be required and an electric pumping plant.

Additions to general manufacturing plants in New England, just announced, include the following: Omo Company, South Farms, Middletown, Conn., addition 40 x 240 ft.; J. O. Coggston & Co., New Haven, Conn., paper boxes, factory 60 x 175 ft., two stories; Famiglietti Bros. Company, Providence, R. I., boxes, addition; Meriden Board of Trade Industrial Association, Meriden, Conn., manufacturing building 40 x 162 ft., four stories, and boiler house, the plant to be occupied by the Brown & Dowd Mfg. Company, Meriden; Metropolitan Carriage Company, Bridgeport, Conn., factory 40 x 70 ft., two stories.

The Corbin Wrench Company, Easthampton, Mass., has been organized with a Massachusetts charter to manufacture a new pipe wrench, the invention of Frank F. Corbin, designed for general use after the manner of the Stillson type. A distinguishing feature is a sliding ratchet which replaces the usual screw. F. F. Corbin is the president, Edward P. Egan treasurer, and N. S. Hitchcock the third director, all of Easthampton. For the present the company will have the parts made by outside parties and will do the assembling itself.

Manning, Bowman & Co., Meriden, Conn., manufacturers of silver and nickel plated ware, are building an addition which will largely increase the size of the press room and about double the capacity of the dipping room. The addition is to the factory building erected in 1907.

The American & British Mfg. Company, Bridgeport, Conn., has secured the contract for 25 additional landing guns for the United States Navy, and this department of the works at Bridgeport, Conn., will have to operate with double force to carry out the order.

Fay & Scott, Dexter, Maine, manufacturers of engine lathes and patternmakers' lathes, are increasing their works by 11,000 sq. ft. of floor space. An addition to the planer and milling rooms will be 40 x 50 ft., one story, while another building will be 40 x 90 ft., two stories, and will be used chiefly for store and stock rooms. Concrete construction will be employed. No new equipment will be required in connection with the extensions.

The Birmingham Iron Foundry, Derby, Conn., rolls rubber mill machinery and general heavy machinery and castings, is preparing plans for a three-story office building 40 x 50 ft., of brick with concrete floors, and containing a three-story vault 10 ft. square. A 10-16-ft. boring mill has just been purchased of the Betts Machine Company. Business is quite good with the company and the works are running full.

The Bridgeport Window Hardware Company has been organized at Bridgeport, Conn., to manufacture various specialties, including a transom operator, blind opener and a burglar proof window lock. It is a Connecticut corporation with paid in capital stock of \$10,000. J. H. Crossley is the president and Arthur B. Lieberum the secretary and treasurer. For the present the products will be manufactured for the company by the R. P. K. Pressed Metal Company, Bridgeport.

The Hubbard & Jopson Mfg. Company, 2 Billard street, Meriden, Conn., successor to the Connecticut Novelty Company, has established a factory for the manufacture of wood and metal novelties. H. E. Hubbard is president and treasurer, and G. W. Jopson vice-president.

The Bridgeport Forge Company, Bridgeport, Conn., has made formal announcement of the change in name of the corporation to the Heppenstall Forge Company, which was mentioned in last week's issue. Sam Heppenstall is the president of the company, H. P. Kuhn vice-president, C. W. Heppenstall manager, Charles S. Lindsay secretary and treasurer, C. J. Sauer sales manager.

The Mossberg Wrench Company, Central Falls, R. I., is building for the Wardwell Braiding Machine Company a line of braiding machines for covering code wire. It is a high speed machine, having a covering capacity of 75 in. a minute on No. 14 code wire.

The L. S. Starrett Company, Athol, Mass., is having plans and specifications prepared by Charles T. Main, mill engineer and architect, Boston, Mass., for a new office and graduating building. The construction will consist of outer walls of brick with reinforced concrete columns and steel framing protected by concrete. The main portion of the building will be 122 ft. 10 in. long and 89 ft. wide. Plans and specifications are also being prepared by Mr. Main for the new seven-story brass foundry of the Yale & Towne Mfg. Co., Stamford, Conn. He is receiving bids for the new hexagonal netting shop of the Clinton Wire Cloth Company, Clinton, Mass. The main part of the building will be 164 ft. 8 in. long and 84 ft. wide, with a 40 ft. x 52 ft. 4 in. connecting wing at one end. The structure will be three stories.

Through its consulting engineer, the Hooper-Faulkner Engineering Company, 165 Broadway, New York City, the Crane Valve Company, Bridgeport, Conn., has just let to the W. H. Boardman Company, New York City, the contract for a heavy machine shop, 50 ft. x 353 ft. It is of interest to learn that the building, which is to be equipped with traveling cranes, was designed, specifications drawn and bid submitted and accepted in just two weeks from the day on which the engineering company took the work in hand.

On the basis of the Government crop report, the statistician of the New York Produce Exchange finds an indicated yield of 508,145,000 bushels of wheat. If the indicated crop is harvested it will mean about 16,000,000 bushels more than the greatest crop on record, which was that of 1906.

## THE MACHINERY MARKETS

### Philadelphia

PHILADELPHIA, PA., May 10, 1911.

Very little change is to be noted in the local demand for machine tools. A slight betterment in some directions, particularly special equipment, usually averages with declines reported in others, and the general trend of the market appears to be toward continued dullness. While merchants, owing to their varied lines, find some scattered business in one direction or another, builders of the standard types of machine tools do not report conditions as favorable as they were, particularly in this territory. In the majority of instances plant operations are on a smaller scale, as orders have not come along with the same frequency as was the case some time ago, and current scattered orders can be supplied from stock in the majority of cases. Builders of heavy special tools find business quieter, but some of the smaller manufacturers are quite busy, as the amount of work required to keep them so engaged is not necessarily large. In second hand machinery a moderate business has been done in some directions, but the general demand is not very extensive. Inquiries are not plentiful, and the few that develop are mostly for single tools, with competition in the majority of cases keen, small propositions receiving as much attention as is usually given to the larger ones. In engines and boilers a fair amount of new business comes out, but pending negotiations close slowly. Iron and steel casting plants show but little improvement in their operative rate.

The plant of the Homer Brass Works, Water and Mifflin streets, was badly damaged by fire May 3. The foundry did not suffer to any great extent, but the machine shop and office were damaged considerably. It is probable that considerable machinery will have to be replaced, but requirements have not yet been decided upon.

The Shipley Machinery Company, Bourse Building, which represents the Toledo Electric Welder Company, Toledo, Ohio, in this territory, reports the installation of a number of special electric welders of that company's manufacture for customers in this territory.

F. W. Tunnell & Co., who have purchased a manufacturing site aggregating 20 acres at Marcus Hook, near Chester, Pa., advise that the purchase was made not with a view of the immediate building of a plant at the new location, but that they were preparing for the future, and nothing had been decided upon or was expected to develop soon in reference to the erection of a new plant.

The purchase, through Samuel Emmert, Hagerstown, Md., of a 15-acre tract of land, in the vicinity of that city, by the New York Central Iron Works, Geneva, N. Y., is announced. It is said that the purchasers will erect a modern plant and remove there from their present location on its completion.

Dienelt & Eisenhardt, Inc., report a very fair volume of business, particularly for special machinery for printing and manufacturing oil cloth. The demand for dead stroke hammers has not been very good, nor has that for hydraulic jacks. Considerable business has been done in its line of Monarch electric motors, but orders for pipe expanding machinery have been comparatively light.

The Energy Elevator Company is operating its plant at practically full capacity, the demand for elevators of all classes being reported as fairly active. An average business is being done in electric, power and hand elevators. Several large automobile lifts are being installed in this as well as other cities, while hand elevators are being shipped to the middle and far West as well as to customers in the South and in New England.

Fire damaged the plant of J. R. Wotherspoon, manufacturer of gas and sheet metal stoves, 240 North Front street, May 4. The nickel plating plant was practically destroyed, while machinery in the sheet metal working department was badly damaged. Repairs and re-equipment of the plant will be made at once.

It is reported that the Southwark Plating Company will erect a three-story brick addition to its plant, 16 x 40 ft., at Fifteenth street and Washington avenue, particulars regarding which are not yet available.

Over 30 charters have been granted to electric and gas companies under Pennsylvania laws during the past week. The majority of these concerns are located in the eastern part of the State, in Delaware, Bucks, Montgomery, Luzerne, and Chester counties. Most of these concerns have been chartered by one group of incorporators residing in Philadelphia and in Luzerne

County, and each company has a nominal capital stock of \$5000. These companies operate in different townships, supplying gas and electric power from central stations, not being in themselves operative companies.

Local builders are estimating on plans for a one and two-story factory building 136 x 176 ft., to be erected for the Manheim Belting Company, Manheim, Pa.

### Cincinnati

CINCINNATI, OHIO, May 9, 1911.

Although business generally appears to be on the mend, a few machine tool builders have considered it expedient to operate their shops on short time. This action was decided on to reduce stocks on hand that have been steadily accumulating for several months. It is believed that this situation will be relieved anyhow by mid-summer, and probably before then if Congress would adjourn. The export demand continues good, and as the American Steel and Wire Company's list is expected to furnish some business for local tool builders the general feeling is optimistic.

Gas engines and small electric dynamos and motors are in demand. Inquiries for large units of power plant equipment are scarce and when a job does come in sight there is some spirited bidding to get it.

On the evening of May 5 the Toledo Electric Welder Company, Cincinnati, Ohio, demonstrated its different electric welding machines to the local stationary engineers. Others present included representatives of the technical press and of the University of Cincinnati. Among the machines that attracted particular attention was one for spot-welding sheets, which it is claimed will revolutionize the manufacture of sheet stoves and ranges.

It is announced that the Ohio Mechanics Institute will move into its new six-story home July 1. The machine shop will be equipped entirely with tools made in Cincinnati, donated by the manufacturers, which generous action on their part was accomplished through the efforts of a committee of the National Metal Trades Association's local branch. Fred A. Geier is chairman of this committee.

It is expected that a large number of Cincinnati engineers will attend the annual meeting of the American Society of Mechanical Engineers to be held in Pittsburgh May 30 to June 2. A. L. DeLeeuw, mechanical engineer of the Cincinnati Milling Machine Company, will read a paper on the "Design of Milling Cutters and Their Efficiency."

The United States Machine & Tool Export Company has been incorporated with a nominal capital stock of \$10,000. It is the purpose of the company to build up an export business in China for machine tools and railway equipment and supplies. A branch office will be established in Shanghai, China, and will be in charge of Fred J. Mitchell, of Portland, Ore. Headquarters will be in Cincinnati and temporary offices have been taken in the Lyric Theatre Building. The principal incorporators are William Haas, Fred Pagels, Jr., Reinhardt Pagels, Spencer M. Jones and E. R. Passel.

In addition to its proposed repair shops, the Cincinnati Traction Company has decided to erect a large storage barn that will be 350 x 370 ft., one story and of brick construction.

The Zimmerman Boiler & Tank Works has been organized at Dayton, Ohio, by William M. Zimmerman. A site has been secured on which three manufacturing buildings will be erected at an early date.

There is an unconfirmed report that the Hamilton Caster & Mfg. Company, Hamilton, Ohio, intends to add to its manufacturing facilities. The company recently increased its capital stock from \$10,000 to \$30,000.

The Board of Trustees, Dayton State Hospital, Dayton, Ohio, will receive bids until May 23 for furnishing and erecting one 250-kw. direct current generator, direct connected to a slow speed Corliss engine. Specifications may be secured from A. F. Shepherd, superintendent of the hospital.

Architect B. S. Hughes, Commercial Tribune Building, Cincinnati, is inviting bids for the construction of a paper factory to be erected at Franklin, Ohio, for the Franklin Coated Paper Company, whose organization was recently mentioned. The new structure will be 90 x 360 ft., one story, with a power house 40 x 80 ft., all of regular mill construction. It is stated that not all of the equipment, which will largely be of a special nature, has yet been provided.

Work on the new addition to the Oakley plant of

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the Cincinnati Milling Machine Company is now well under way, and the building will probably be under cover before August 1.

It is stated that the Wright Bros. have definitely decided to proceed with work on the proposed addition to their Dayton aeroplane factory, mentioned some time ago. E. W. Russ, Dayton, Ohio, is architect in charge of the plans.

The Mansfield Specialty & Machine Company is a new incorporation at Mansfield, Ohio, to take over the machine shop business of Krebs & Beilstein. The capital stock of the company is \$5,000.

The Smith & Johnson Mfg. Company is a new Cincinnati incorporation with \$15,000 capital stock and has taken over the business of Smith & Baxter, manufacturers and dealers in hardware specialties. No plans have been made for any immediate enlargement of present manufacturing facilities.

The Seufferle Cooperage Company, a new Cincinnati incorporation, has taken over the cooperage business of William Seufferle, and in a short time will commence work on a large factory for the manufacture of whisky barrels. Equipment for dry kilns and a large power plant will be required for the new plant.

It is reported from Portsmouth, Ohio, that the American Drying Machine Company, maker of dryers, cotton pickers and other machinery, has decided to locate its plant in Portsmouth, occupying quarters in the building of the Portsmouth Machine & Castings Company.

**Cleveland**

CLEVELAND, OHIO, May 9, 1911.

Business is not brisk in machinery lines, but there is some improvement over April in the volume of small inquiries. Dealers are figuring on considerable prospective business but orders are slow in coming out. Sales during the week were limited closely to single tools. April business footed up somewhat better than was expected during the latter part of the month, the volume being about the same as during March. Local builders of machine tools appear confident of an early increase in orders and are making considerable machinery for stock. Makers of turret lathes report a slight improvement in orders. The demand for handling machinery is light. The boiler trade is fairly active. The demand for second-hand machinery is only moderate. Conditions in the local foundry trade show little change. Orders for castings are mostly for small lots for early delivery, and with few exceptions founders are not running at full capacity.

The Cleveland Motor Truck Company, Cleveland, expects shortly to buy some additional machine shop equipment, including a 30-in. boring mill, screw machine, tool room lathe and a turret lathe.

The Cleveland Railway Company is planning the expenditure of about \$2,500,000 in extensions and improvements during the coming year. A large portion of the expenditure will be for new cars and additional power equipment.

The Warner & Swasey Company, Cleveland, has practically completed a large addition to its plant. Additional machinery equipment will not be purchased for the present.

The National Tool Company, Cleveland, has purchased a site for a new plant in order to largely increase its capacity. Building operations will not be started for some time.

The Banner Electric Company, Youngstown, Ohio, will shortly begin the erection of an addition to its plant for the manufacture of globes for incandescent lights. The building will be about 150 x 230 ft., four stories.

The C. E. Squires Company, Cleveland, maker of steam specialties, has just completed a new plant at East Fortieth street and Kelley avenue. The building is 64 x 90 ft., one story.

The Plumbers' Fixture Mfg. Company, Cleveland, has been incorporated with a capital stock of \$10,000 by W. H. Dettlebach, W. J. Bergens, E. P. Strong, William McMahon and J. Grohs.

The Standard Sad Iron Company, Mansfield, Ohio, has been incorporated with a capital stock of \$2,000 by Fred D. Stotler, George H. Nagle and others.

With a capital stock of \$20,000 the O'Donnell Elevator & Machine Company, Cleveland, has been incorporated by J. P. O'Donnell, G. Brandenberg, John E. Nygren, J. L. Benson and M. H. Leonard.

The Canton Electric Company, Canton, Ohio, will build an addition to its power plant 72 x 124 ft. and is planning other improvements involving an aggregate expenditure of \$300,000. The new equipment to be purchased will include one 3000-hp. and two 6000-hp. generators.

The Director of Public Service, Toledo, Ohio, will receive bids May 26 for one rotary pump of 15,000,000 gal. daily capacity, direct connected to a vertical gas engine of sufficient capacity to operate on producer gas; also for one bituminous coal gas producer and accessories of approximately 400 hp. continuous capacity.

The Olive Machine Company, Ironton, Ohio, is planning extensive additions to its plant involving an expenditure of about \$50,000. A new building 80 x 200 ft. will be erected.

The Board of Trade of Massillon, Ohio, has made a proposition to Bertsch & Co., Cambridge, Ind., for the removal of their plant to Massillon. They make bending, shearing, punching and corrugating machinery.

The property of the Orrville Pump & Furnace Company, Orrville, Ohio, comprising a foundry and machine shop, has been sold at bankruptcy sale to the Citizens' National Bank of Wooster, Ohio, for \$6,850.

**Chicago**

CHICAGO, ILL., May 9, 1911.

Machinery dealers in the Chicago market are taking a decidedly more optimistic view of the business situation than for some weeks. This condition is not the result of large sales, but is rather due to a fair volume of business emanating from a variety of sources. Sales as a rule are small, but the number of purchasers is most pleasing. No new railroad lists have appeared during the week under review, but the Santa Fé is reported to be on the point of closing the purchase of its recently issued machine tool list, which totals about \$10,000. The American Steel & Wire Company is out with a list approximating about \$75,000, the great bulk of which is machine tools, but it also contains about \$5,000 worth of woodworking machinery. This equipment is intended for the various shops of the American Steel & Wire Company's plants in several States. Among the most interesting sales made in this market during the past seven days are \$4,000 worth of machine tools going to a manufacturer in Cuba and \$700 worth for export to Spain. Country business is very fair.

The Shirley Radiator & Foundry Company, Shirley, Ind., manufacturer of boilers and radiators, has just completed additions to its plant which will more than double its capacity. The buildings erected are of concrete construction, with walls seven feet high, the position above being entirely of glass. The company has increased its equipment for both boilers and radiators. An industrial track system has been installed throughout the entire plant, making it possible to deliver iron direct to the molding floor, and at the same time taking away the manufactured product. The company's shipping facilities have also been improved so as to load ten cars from the platform at one time without interfering with inbound freight. Additional warehouses are being erected and all departments are being enlarged.

New Athens, Ill., will expend \$35,000 for the installation of a water works system, contracts for which will be let in about 60 days.

The Bradley Polytechnic Institute, Peoria, Ill., is planning to erect during the coming summer a power house to be equipped with machinery of sufficient capacity to care for both its present and future needs. C. A. Hoppin is the architect in charge.

The H. W. Clark Company, Mattoon, Ill., has been incorporated with a capital stock of \$50,000. The incorporators are Horace W. Clark, Charles H. Tillotson and Dwight P. Child. The company will engage in general manufacturing.

The American Zinc, Lead & Smelting Company is preparing to erect a six-block zinc smelter at Hillsboro, Ill. W. F. Rossman, manager of the company's smelters in Kansas, will have charge of the building operations there. The plant, when completed, will save its sulphur fumes in the roasting of the blend ores and convert it into sulphuric acid.

Charles G. Shaw, Missouri City, Mo., is rebuilding his coal mining plant which was destroyed by fire about a month since.

The East St. Louis Cotton Oil Company, East St. Louis, Ill., has closed a deal for the remnants of the

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plant of the Farmers' Union Gin & Milling Company, which was destroyed by fire last December.

Sealed bids will be received by North Mankato, Minn., until May 22, for the construction of a water-works system. Bids will also be received at the same time on electric pumping equipment consisting of two three-phase, 60-cycle, 220-volt motors, direct connected to single-stage centrifugal pumps. Alternate bids will be received on gasoline equipment, consisting of engine and triplex pump.

The Star Foundry Company, Albert Lea, Minn., is erecting a new foundry building, 60 x 160 ft., at Waterloo, Ia., into which it will move its plant when completed in the course of about 60 days. The building will be equipped with electric traveling cranes and will be located in North Waterloo.

The Antigo Water Company, Antigo, Wis., will construct a 400,000-gal. reservoir and make other improvements to its plant.

Preparations are being made for the consolidation of the International Hoist Company and the Pioneer Iron Works Company, both of Antigo, Wis. Improvements will be made and new equipment installed, but details have not been decided upon.

Jamestown, S. D., will extend its water-works system.

### Detroit

DETROIT, MICH., May 8, 1911.

The first week of May, marked by excellent weather, has also been prominent for the large amount of spring orders. The automobile industry has been the recipient of many good orders and shipments were large. The auto equipment makers are still enjoying an excellent trade, and numerous new concerns are springing up through the State. The stove manufacturers of this city report very quiet conditions, with no large volume of new business in sight. Paper mills, principally in Kalamazoo, find trade dull, owing to the condition brought about by the reciprocity proposal. Building in this city is very active, with two new skyscrapers planned this week.

The Ford Automobile Company shattered all records in shipments of machines for April. Exactly 5430 cars were manufactured this month, which shows the prosperous condition of the automobile trade.

The Packard Automobile Company has plans completed for additions to its plant, in an effort to keep up with the demand for its new trucks. The additions will practically triple the capacity of the truck shops. A new foundry of 9600 ft. of floor space is one item, while additional floors to the service shops will bring the total of new floor space to 160,000 sq. ft.

The Solvay Process Company, of this city, is engaged in the construction of one of the largest additions to its mammoth plant of any undertaken in this city for several years. The building is an entire steel structure, three stories, and covering about seven acres.

A concern of some magnitude was organized at Grand Rapids this week, when the Keeler Brass Company filed articles of incorporation with the secretary of state. The company starts with a capital stock of \$250,000.

A fair-sized plant will be erected in this city by the Simplex Bolt & Nut Company, which filed articles of incorporation this week, with a capital stock of \$10,000. Frank H. Kimball and Edward Barret are the principal stockholders.

The branch plant of the Carter-Car Automobile Company, of this city, suffered a \$50,000 loss by fire this week. About ten cars were consumed in the blaze.

The Withington-Cooley Company, Jackson, Mich., will soon undertake some very important improvements. Entirely new buildings will be erected, allowing a floor space of 60,000 sq. ft. The company will install new hoistings and conveying machinery, and will add, when improvements are complete, 200 men to its working force.

The Board of Trade of Rochester, Mich., will raise \$15,000 to finance the organization of a gas engine concern, \$10,000 of which will be expended for machinery and equipment. The company will have a capital stock of \$25,000.

The Terrel Equipment Company, Grand Rapids, Mich., will shortly lease a new factory building, being erected by Caulfield & Co., to care for its increasing

business. The building is a two-story structure, 70 x 320 ft. The company makes steel lockers and other equipment.

The Advance Mfg. Company has located at Hastings, Mich., and will manufacture a suction sweeper, the invention of a local man.

The Duroy Mfg. Co., with mills near Cadillac, Mich., is building a reinforced concrete addition to its plant, 50 x 60 ft. in size. The company makes woolen goods.

The Schlitz Brewing Company, Grand Rapids, Mich., has secured building permits for the erection of a good-sized addition to its plant. The building will cost about \$6,000.

The Excelsior Wrapping Company, Grand Rapids, Mich., will soon commence the erection of a large addition to its factory at Godfrey and Hall streets. The structure is to be of brick, and will cost about \$5,000. This will give the company needed space for its growing business.

A comparatively new Grand Rapids industry is the Grand Rapids Hosiery Company, which at this time is growing at a rapid rate. The company started with 40 machines in March, and now has 69. It has just placed an order for 14 more, and will continue to increase its plant capacity as its business warrants it.

The New Holland Lumber Company, New Holland, Mich., filed articles of incorporation this week with a capital stock of \$25,000, and will commence the erection of mills and sheds at an early date. D. W. Jellama is a prominent stockholder.

The Grand Rapids Cigar Box Company, Grand Rapids, Mich., is undertaking some important improvements to its plant. A three-story brick factory addition is to be erected immediately, to cost \$10,000.

The Detroit Free Press Company, of this city, has commenced the construction of a fine new office building that will also contain the printing plant. The new plant is to be one of the most modern and perfect that money can buy, including presses, typesetting machines and stereotyping outfits. The work of printing the paper has heretofore been in the hands of the Record Printing Company.

The plant of the Charlotte Mfg. Company, Charlotte, Mich., which was closed down several weeks ago, has resumed operations with plenty of orders on hand and a full force.

The Bauer Metal Body Company, Detroit, is seriously considering the moving of its plant to Big Rapids, Mich. It is understood that the removal rests upon the lease of its buildings in this city.

An industry of importance to the auto accessory trade of this city is the new Michigan Bow Socket Company, which filed articles of incorporation this week. The company has a capital stock of \$15,000.

A new paint and enamel manufacturing company, of Kalamazoo, Mich., is the American Enamel Company, incorporated with a capital stock of \$10,000.

For the purpose of caring for more trade and for the purpose of new machinery, the Coopersville Creamery Company, Coopersville, Mich., has increased its capital stock from \$18,000 to \$36,000.

Extensive improvements are in contemplation at the Caro plant of the Michigan Sugar Company. The company will add three new pulp presses to the battery of five already in use.

A good-sized woodenware plant is to be built at Munising, Mich. The financing of the plant will be taken care of by the Business Men's Association.

The Scott-Lutgers Company, Holland, Mich., is planning the erection of a new planing mill for interior finish material. The mill will be built on the shore of Macatawa Bay.

The Michelson Lumber Company, operating two mills at Michelson, Mich., the new lumber town at Houghton Lake, may erect another mill there this season. Plans are being considered.

Augustus Kitzinger, Charlevoix, Mich., is at the head of a company planning to finance the erection of a new \$50,000 mill on Beaver Island. A mill on this site was destroyed by fire last winter.

The Excelsior Foundry Company, Bay City, Mich., whose plant was recently destroyed by fire, states that it will rebuild on a much large scale, of steel and concrete construction. The company will probably be in the market for traveling crane and some other equipment. A steel converter may also be installed, but this has not been definitely decided upon.

## THE MACHINERY MARKETS

### Indianapolis

INDIANAPOLIS, IND., May 9, 1911.

The Automatic Machinery Company, Indianapolis, has been incorporated with \$10,000 capital stock to manufacture automatic bottle machinery. The directors are John J. Gaynor, E. W. Miller and Clifford Remler.

The Russel Windstacker Company has been incorporated at Indianapolis, with \$100,000 capital stock to manufacture windstackers and other agricultural machinery. H. A. Russell is president of the company.

The Arbogast Aero Company, Anderson, Ind., has been incorporated with \$10,000 capital stock, to manufacture air craft. The directors are Ernest W. Daniel and John R. Arbogast.

J. A. Swinehart, Akron, Ohio, has bought the Goshen Rubber Works, Goshen, Ind., from the receiver, George R. Harper.

J. L. McCulloch, Marion, Ind., has secured a franchise in that city for an artificial gas plant, which is to be in operation within a year.

The Spencer Construction & Equipment Company, Rockport, Ind., has been incorporated with \$25,000 capital stock as a general contractor. The directors are B. F. Huffman, R. S. Crowder, E. P. Cox, J. G. Rieusted and H. C. Watkins.

Two receivers have been appointed for the Jenney Electric Mfg. Company, Anderson, Ind., the Security Trust Company, Indianapolis, and J. J. Netterville, Anderson.

Flavius J. Jackson, receiver for the Home Heating Company, Anderson, has been ordered by the court to sell the plant. The prospect is that it will be purchased by local capitalists, who will organize a new company and rebuild and enlarge the plant.

The Commercial Club of Greenfield, Ind., has contracted with the American Roller Screen & Stamping Company for the establishment of a plant there to manufacture patent roller screens. The company will employ 50 men.

The Builders' Supply Company, Indianapolis, has changed its name to the Capital Builders' Supply Company.

The James C. B. Beatty & Sons Mfg. Company has been incorporated at Frankfort, Ind., with \$10,000 capital stock, to manufacture kitchen cabinets and other furniture. The directors are J. C. B. Beatty, G. K. Beatty and G. O. Beatty.

The Terre Haute Manufacturers' Club, Terre Haute, Ind., has elected the following officers: President, Charles W. Hoff; vice-president, T. F. Grover; secretary, W. C. Ball; Treasurer, D. C. Worsham.

The S. J. Gardner Foundry & Machine Company, New Albany, Ind., has been incorporated with \$50,000 capital stock. The directors are S. J. Gardner, F. S. Sisloff and Margaret C. Gardner.

Fred S. Hunting, Ft. Wayne, Ind., has been appointed receiver of the Angola Railway & Power Company, Angola, Ind., which operates the street railroad lines there and the electric light and waterworks system.

The Monarch Cut Stone Company, Clear Creek, Ind., has been incorporated, with \$25,000 capital stock, to manufacture building stone. The directors are A. Lawson and James Lawrence, of Bloomington, Ind., and C. H. Moline, Clear Creek.

The Calumet United Railways Company, a \$5,000,000 corporation, with C. H. Geist, of Philadelphia, at the head of it, has been granted a 50-year franchise to operate a street railroad in Gary, Ind. The system to be built will give Gary connection with Chicago.

The Terre Haute Electrical Porcelain Company, Terre Haute, Ind., has been incorporated with \$25,000 capital stock to manufacture electrical porcelain. The incorporators are William H. Glover, J. G. Hamilton and E. R. Coleman.

The Carbo Light Company, Anderson, Ind., has been incorporated with \$30,000 capital stock to manufacture automobile lighting devices. The directors are E. S. Albright, P. H. Doyle, A. A. Beckman, E. W. Fenwick and G. R. Burkdoll.

The Jones Automatic Measuring Pump Company, Shelbyville, Ind., has increased its capital stock from \$25,000 to \$35,000. T. E. Goodrich is president of the company.

The Richmond Lamp Mfg. Company, Richmond, Ind., has been incorporated with \$50,000 capital stock to manufacture carriage and other lamps. The directors are James M. Judson, F. W. Judson and Henry Wetzel.

The Goshen Churn & Ladder Company, Goshen,

Ind., has commenced work on the construction of a new factory building, 64 x 165 ft., two stories, which will triple its present floor space. A new engine and boiler room will also be erected and equipped with new boilers and an engine of 100 to 150 hp., the type of which has not yet been determined upon. New dry kilns will also be installed.

The Frank Prox Company, Terre Haute, Ind., manufacturer of steam and hot water boilers, hot water heaters and plumbing, steam and gas fitting supplies, will commence work in the near future on the construction of three factory buildings to be completed by August 1. One of the buildings will be 80 x 400 ft., one story, and the other two 80 x 200 ft. The buildings will be constructed with steel sash. The site upon which they are to be erected consists of nine acres. It is the intention of the company to install its present equipment in its new plant and purchase new equipment sufficient in quantity to increase its output about 50 per cent.

### St. Louis

ST. LOUIS, Mo., May 8, 1911.

The Zwalle Light, Ice & Power Company, St. Louis, has been incorporated with a capital stock of \$25,000. The incorporators are William D. Stock, John W. Stock and James A. Steele. The company will engage in manufacturing gas and electricity for light, heat and power, and also manufacture ice.

The American Co-operative Union Supply Company, St. Louis, has been incorporated with a capital stock of \$5,000. The incorporators are William S. McAdams, Louis A. Ragan and John P. McDonough. The company will engage in the manufacture of household supplies.

The U-need Sanitarium & Manufacturing Company, St. Louis, has been incorporated with a capital stock of \$10,000. The incorporators are Ida R. Cook, James H. Campbell and John Kean. The company will engage in the manufacture of toilet articles.

The American Presta Vending Machine Company, St. Louis, has been incorporated, with a capital stock of \$100,000. The incorporators are William H. Palmer, Joseph Laeckener and J. W. George. The company will engage in the manufacture of automatic vending machinery.

General Manager Tyler, of the St. Louis & San Francisco Railroad, recently visited Rolla, Mo., for the purpose of conferring with the business men of that town with reference to the location for a new bridge to span the Little Piney River at that place. It was finally decided to locate it at or near the present swinging bridge.

The King Foundry Company, St. Joseph, Mo., has been incorporated with a capital stock of \$15,000. The incorporators are Oliver M. King, David E. Heaton and Lewis Siegel.

The Lafayette Coal & Brick Company, Kansas City, Mo., has been incorporated with a capital stock of \$150,000. The incorporators are H. P. Allen, S. E. Snyder and J. E. Wilson.

The Randolph County Gas & Electric Company, Moberly, Mo., has been incorporated with a capital stock of \$100,000. The incorporators are Thomas F. Fulker-son, Walter C. Duncan and James T. Menefee.

The Garden City Buggy Company has completed arrangements for the removal of its factory from Garden City, Mo., to Fort Smith, Ark., where it will erect a new plant, the main building of which will be 100 x 200 ft., three stories. The factory is to be completed in time for occupancy October 1. Considerable more equipment than is used in the present plant of the company will be required.

A Kirksville, Mo., manufacturer of cash registers is negotiating with the Commercial Club of Rogers, Ark., with a view to securing a location there.

The electric light plant at Fort Scott, Kas., was destroyed by fire May 2. The loss was \$75,000. The plant was owned by John E. McKinney and others, of St. Louis.

The Red Fork Gin & Milling Company, Red Fork, Okla., has been incorporated with a capital stock of \$4,000. The incorporators are O. C. Brooks, R. M. Brown and George Sawyer.

The Wood-Knight-Hawk Company, Oklahoma City, Okla., has filed articles of incorporation with \$400,000 capital stock. The company will manufacture a motor

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plow recently invented and known as the Alltivator, and will begin the construction of a factory in the near future, and will be in the market for all the machinery required for its equipment. H. D. Knight, a wealthy capitalist of Oklahoma City, will be president of the company. Other stockholders are H. B. Wood, Homer H. Dunlap and F. J. Hawk.

The Oklahoma Lightning Arrester Company, Tulsa, Okla., has awarded a contract for the erection of a two-story factory building at a cost of \$12,000.

### The South

LOUISVILLE, Ky., May 9, 1911.

Business locally remains rather quiet, as far as the booking of new orders is concerned. Reports still emphasize the fact that there is plenty of business in prospect, although buyers seem to be hesitating about closing for equipment. There has been a lull in the demand for boilers and other power equipment. Quarrying and crushing machinery, on account of the activity of road building in this section, is selling in volume.

The Carbondale Machine Company, Carbondale, Pa., is installing refrigerating machinery in the plant of the Fetter Heating & Lighting Company, Louisville.

The Defiance Machine Works, Defiance, Ohio, has secured the contract for the installation of rim manufacturing machinery in the plant of the Kentucky Rim & Shaft Company, Louisville.

The Brinly-Hardy Company, Louisville, manufacturer of farm implements, is preparing to close for a number of machines to be installed in the forging department, including drophammers, bulldozers, &c.

The Brandeis Machinery & Supply Company, Louisville, has secured the contract for equipping the rock-crushing plant of the Kentucky River Stone & Sand Company, Lawrenceburg, Ky. This concern has been incorporated with \$15,000 capital stock by E. W. Ripy, William Edwards and J. C. Ripy.

Although it will not need the equipment in the immediate future, the Kentucky Electric Company, Louisville, has drawn plans for a coal crushing and conveying plant which is to be installed in its new plant later on.

The University of Louisville, of which John Patterson is dean, will require some equipment for its electrical department, which will be fitted up in connection with the engineering courses which have been planned for the coming session.

Machinery men interested in the coal mines of eastern Kentucky-Tennessee have learned of the consolidation of many of the most important properties in that section under the name of the Continental Coal Corporation, which has a capital stock of \$3,000,000 and will issue \$3,000,000 of bonds. Chattanooga and Louisville capital controls the new company, of which Eagle Martin is President and general manager, with headquarters at Chattanooga. The company has 30,000 acres of coal lands and owns 11 miles of railroad.

Work has been begun, it has been announced, at the New Decatur, Ala., shops of the Louisville & Nashville Railroad, on the safety appliances which are to be installed on the freight cars of the road. The changes are being made at heavy expense.

The Selden-Breck Construction Company, St. Louis, Mo., has been awarded the general contract for the erection of the 10-story annex of the Weissinger-Gault apartment house at Third street and Broadway, Louisville. The contract amounts to about \$250,000. Contracts will be let by the company for the elevators and other equipment of the building in the near future.

Adam Vogt has purchased the plant of the old Northern Lake Ice Company, at Sixteenth and High streets, Louisville, from the Merchants' Ice & Cold Storage Company. It is probable that improvements will be made and the plant put into operation again.

The Kentucky Foundry Company, Eddyville, Ky., has filed a certificate of dissolution.

The Luton Coal Company has been organized at Providence, Ky., and will begin the development of 500 acres of coal lands at once. R. W. Hunter, J. E. Morgan and S. K. Luton are interested.

The Dyeoplane Company of America has been incorporated at Newport, Ky., with \$50,000 capital stock by Cleveland H. Dye, J. Frank Dye and E. P. Taylor for the manufacture of aeroplanes. The company will require some wood-working machinery for its plant, which will be erected in July. The address of the concern is 502 Monmouth street, Newport.

The United Water, Light & Traction Company, Somerset, Ky., which recently took over the public service corporations of Somerset, has begun plans for improvements, which will include adding to the equipment of the power house of the street railroad. The water plant is to be given an enlarged reservoir capacity.

The Model Laundry & Cleaning Company has been organized at Hopkinsville, Ky., with \$10,000 capital stock by S. D. Langley, of Madisonville, Ky., and others. A building is now being erected and power equipment and laundry machinery will be purchased at once.

The fiscal court of Henderson county, at Henderson, Ky., is to let contracts for the erection of 14 steel bridges in the near future.

C. E. James and others have secured a franchise at Chattanooga, Tenn., for the construction of an electric line in the city and suburban roads leading out from it. Work must be begun in the next six months. The company to be formed will have no connection with the Chattanooga Railway & Light Company, so that it will build its own power-house.

The Lexington Ice Factory Company has filed articles of incorporation at Lexington, Tenn., with \$5,000 capital stock. C. P. Wilson and Davis E. Aden are interested.

The Champion Lumber Company has acquired the Tennessee & North Carolina Railroad Company and is planning extensions into its timber holdings, which are to be developed on a large scale. Its big sawmill at Crestmont, N. C., is to be greatly enlarged.

New machinery is to be installed in the plant of the Humboldt Marble & Granite Works, Humboldt, Tenn. The floor space of the plant will be doubled.

The Memphis Automobile & Garage Company has been incorporated at Memphis, Tenn., with a capital stock of \$150,000. A large repair shop is to be equipped. The incorporators of the company are J. W. Falls, R. H. Lake, N. C. Perkins, S. T. Carnes and E. B. LeMaster.

W. W. Hendrix, Cookeville, Tenn., is to build an electric light and power plant at Livingston, Tenn. He is planning the development of several water power sites near Cookeville.

The Tennessee Cotton Oil Company, Memphis, Tenn., is to install machinery for the manufacture of fertilizer and the ginning and baling of cotton. It has filed an amendment to its charter providing that it may engage in these businesses.

Announcement has been made that the J. A. Wilkinson Lumber Company, which has been incorporated with \$100,000 capital stock at Bristol, Tenn., will require no equipment, as it will take over the sawmills of J. A. Wilkinson.

The Hager-Elliott Engineering Company is erecting a plant at Nashville, Tenn., for the practice of automobile engineering of all kinds. It has maintained a large automobile garage and repair shop for some time. A new building of reinforced concrete and brick is now being put up.

A cement mill will probably be established at Limestone, Tenn., by N. A. Morelock, who is inquiring for prices on crushers, burners, grinders and other equipment for a plant of that character.

The Cookeville Roller Mill, Cookeville, Tenn., is planning to increase its capacity considerably.

Machine tools and other equipment are wanted by the Mt. Pleasant Auto & Machine Company, Mt. Pleasant, Tenn., which was recently incorporated with \$5,000 capital stock. J. P. Warnack is manager of the company.

The Roberts & Schaefer Company, Chicago, Ill., has been given the contract for the construction of a coaling station with 500 tons capacity for the Queen & Crescent Route at Montlake, Tenn. Conveying machinery will be required.

J. A. Shull, Neva, Tenn., is in the market for a gasoline engine to furnish the power for a threshing machine.

J. M. Cameron, Johnson City, Tenn., has invented a universal nozzle for use on fire hose. Arrangements are being made for its manufacture, following several successful demonstrations.

The Thompson Electric Clock Company has been incorporated at Memphis, Tenn., by W. H. Thompson and others with a capital stock of \$1,000.

It is reported that a company will be organized at Johnson City, Tenn., for the construction of an electric interurban line between that city and Newport, Tenn.

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a distance of 55 miles. If the plans are carried out a hydro-electric power plant will be built at Embreville, on the Chucky River. The proposed capital stock of the company is \$100,000.

Knoxville, Tenn., is a good market for smoke consumers at present, as the result of a campaign which is being waged. The Knoxville Railway & Light Company has equipped its eight boilers with consumers.

The Lake County Mfg. Company, Tiptonville, Tenn., is in the market for a pump and other well-drilling machinery.

Ashdown, Ark., is contemplating the construction of municipal electric light and water plants.

Quitman, Ga., is in the market for an engine and dynamo of limited capacity.

F. S. Twitty is organizing a company for the establishment of an electric power plant to cost \$15,000 at Columbia, Ala.

The municipal water works, Mena, Ark., is to be rebuilt at a cost of \$60,000. Winters & Dove, Fort Smith, Ark., are drawing plans for the work.

The American Granite Company is being organized at Augusta, Ga., with a capital stock of \$600,000, for the development of 100 acres of granite property near Augusta. Charles F. McKenzie will be president of the company, which will install a modern plant.

A compound condensing steam turbine plant is to be built at North Montgomery, Ala., by Richard Tillis, of the Citizens' Light, Heat & Power Company, Montgomery. Contracts for the equipment are now being let.

A machine shop is being built at Madisonville, Ga., by the Madisonville Auto & Machine Company, of which O. L. Hedenburg is manager.

A jet type condenser to cost about \$25,000 is to be purchased by the Montgomery Light & Water Power Company, Montgomery, Ala. H. W. Scott is general manager.

The Westbrooks Mfg. Company, Jackson, Miss., will buy a chain mortiser and other woodworking machinery.

A 20-h.p., three-phase motor is wanted by the Capital Mfg. Company, Jackson, Miss. Address J. M. Hartfield, president.

The city of Swanquarter, S. C., will open bids May 16 for the installation of a pumping plant, including suitable pumps, engines and boilers, to discharge 1800 cu. ft. of water per second against a head of 8 ft. J. O. Wright, Tallahassee, Fla., is consulting engineer.

The town of Fort Valley, Ga., has voted for the issuance of \$40,000 of bonds for the construction of a water works system.

The city of Oglethorpe, Ga., has voted \$18,000 of bonds for the construction of a water works and electric light plant. Bids will be opened June 1 by the Mayor, J. P. Nelson.

The Gulf Machine Works, successor to the Gulf Machine & Auto Works, Tampa, Fla., has about completed the construction of its new building and will be in the market shortly for one radial drill with 4 or 5 ft. arm, a boring mill with 8-ft. swing and a 40-in. planer.

### Western Canada

WINNIPEG, MAN., MAY 5, 1911.

The Sandstone Brick & Sewer Pipe Company, whose works are 20 miles south of Calgary, Alberta, and whose head office is in that city, will be ready to begin manufacturing operations in July. Some of the machinery has arrived and more is on the way.

The Commissioners of Edmonton, Alberta, have referred to the superintendent of works the tenders received for the power machinery. Owing to delay on the part of the municipal authorities it is found that the mixed pressure turbines cannot be installed in time to be in use next winter. As the high pressure turbines can be set up before the end of the summer it has been decided that this type of machine will be preferred for part of the plant and a 1,200-kw. high pressure turbine is to be purchased from the Allis Chalmers Company.

The Esquimalt Graving Dock & Shipbuilding Company, Victoria, B. C., is now in a position to proceed with the great works it proposes to establish at Esquimalt, B. C. An order in council has been passed by the Dominion government granting the company the benefit of the arrangement provided for by Parliament last year—namely, the paying by the government of 3½ per cent. per annum for 35 years upon the total cost

of the dry dock and ship repair plant. According to the estimate of the Public Works Department's engineers, the dry dock, wharf, repair machinery and buildings will cost \$2,637,800. The promoters are the Bullocks, well-known shipbuilders on the Pacific Coast, and with them are associated in the company the Denny Bros. of Dunbarton, Scotland.

It is stated that the National Transcontinental is about to give out a contract to build car shops and other works at Winnipeg, to cost \$2,500,000.

R. B. McArthur, Deseronto, Ont., is negotiating with the municipal authorities in Port Arthur, Ont., to establish a match factory there to employ 200 hands.

### Eastern Canada

TORONTO, ONT., MAY 6, 1911.

Fine weather has had a wonderfully accelerating effect upon trade that was already rather active. The season is now completely open, navigation having got started on the Lakes and St. Lawrence, seeding being nearly over, and growth well advanced in various parts of the country. It will need an additional strong wave of British capital to supply the funds required for current business. Capital, of course, is not brought into the country to be used merely as advances and current loans to business men, but there has been a large incidental use of money borrowed abroad in recent years. The various large borrowings or flotations have brought in scores of millions as the result of our financial operations in several cases. The Dominion government, or the particular Provincial government, or the railroad company, or other large corporation, could not spend the money in a period much shorter than two or three years, as the work to which it was being applied would be very extensive. Thus there would be lying on deposit in the banks large balances to the credit of such importers of capital. But as the works were being carried out the capital became absorbed, and the extra quantity of funds that had been at the disposal of the banks for current business needs became much smaller. There will be great replenishments, however, as the result of forthcoming issues, and then the banks will be in a position to take better care of manufacturing and mercantile customers. There is a present danger of a perceptible money shortage. The strike of the structural steel workers, though the number of them is not great, is disturbing, as it arrests the work of other bodies of men in the building trades. There is an expectation of a strike on the part of the brass moulders of Toronto.

Work has begun upon the construction of the Canadian General Electric Company's new lamp department building at its plant in Peterborough, Ont.

The Blairton iron mines, in the township of Belmont, Ont., have been taken over by a company known as the Blairton Iron Mines Company of Toronto, the price paid, according to current report, being \$75,000.

Dredging has been commenced at Longue Pointe, Montreal, on the site chosen for the large dry dock to be constructed at that city.

It is announced by the Industrial Commissioner of Brantford, Ont., that a Canadian branch factory will be established in that city by the Buffalo Brake Beam Company. The coming of the branch is a consequence of the large railway development in this country.

The Bain Wagon Company, Woodstock, Ont., will extend its buildings and enlarge its equipment sufficiently to add employment for 50 to 75 more hands. It will then have about 400 men at work. The company will also erect a large warehouse in western Canada this summer, either at Winnipeg or Calgary.

The Canadian Light & Power Company, Montreal, has applied to the Dominion government for permission to build a dam on the St. Lawrence, from Coteau du Lac to Clark's Island. The purpose is to develop 62,000 hp. Sluiceways would be put in for the passage of boats. The application was opposed by the Cedar Rapids Power Company, the Beauharnois Power Company, the Richelieu & Ontario Navigation Company and the Dominion Marine Association. Sir Wilfrid Laurier, Premier of Canada, promised that a commission would be appointed to inquire into the whole question of St. Lawrence River dams and effect on navigation.

The tenders for the construction of the four cruisers and six destroyers required for the Canadian navy are now in the hands of the Dominion government. It is said that six firms tendered. These are named as fol-

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lows: The Swan, Hunter, Wigham, Richardson Company, Vickers-Maxim Company, Armstrong Shipbuilding Company, Harland & Wolff and Fairfield Company. As the ships must be built in Canada the successful tenderer or co-operating tenderers must build works in Canada.

G. M. Berry, secretary of the Thomas B. Jeffrey Company, Kenosha, Wis., was in Ottawa, Ont., some days ago. He says that the company will open in Canada two selling branches, one of which will be in Winnipeg, the other in Toronto, Ottawa, or Montreal. If the business warrants it this departure will, he says, be followed by the establishment of a plant in Canada to make the company's Rambler automobiles.

The Canadian Westinghouse Company, Hamilton, Ont., has taken out a permit to erect an addition to its pattern shop and an addition to its machine shop, at a cost of \$65,000.

The Jules Motor Company, Toronto, is negotiating with the municipal authorities of Peterborough, Ont., to establish works in the latter city.

The large extension to the Canadian Pacific Railway Company's Angus locomotive works, at Montreal, is nearly finished.

The City Council of Toronto is about to advertise for tenders for the supplying of a long intake pipe, 6 ft. in diameter, for the municipal waterworks. Sufficient time is to be given for local agents of British houses to get the contract before their principals.

M. J. O'Brien has obtained the contract to build the 56 miles of the Quebec & Saguenay Railway from a point near Ste. Anne de Beaupré to Murray Bay, Que. The work is to be finished by September, 1912, and is to cost \$2,000,000.

Plans for the greatest railroad shops in Canada outside of Winnipeg have been prepared for the National Transcontinental Railway Commission. The shops are to be built near Quebec city. It is announced that tenders will be called for at the end of this month for the construction of the Grand Trunk Pacific Railway station at Quebec city, and that tenders for the shops mentioned will be advertised for soon afterward.

The following concerns in Berlin, Ont., are extending their plants: Lang Tanning Company, Kaufmann Rubber Company, D. Hibner Furniture Company, T. McBrien Trunk Company, Western Shoe Company, Interior Hardwood Company, Walker Bin Company and C. H. Doerr & Co. The Brierthaupt Leather Company is branching into the manufacture of shoe counters and tap soles. The Cloisonné Glass Company and the Onward Mfg. Company—which makes sliding furniture, stoves and vacuum cleaners—will erect new factories in Berlin. The Canadian Pyrofugout Flooring Company has started into business there with a capital stock of \$50,000.

The Grand Trunk Railway Company will spend \$10,000,000 upon the improvement of its terminal facilities at Montreal. Plans have been laid before the Railway Board of Canada and before the City Council of Montreal.

The laborers employed in the foundry of the Malleable Iron Works, Smith's Falls, Ont., have struck for an increase of 15 cents per day. About 360 men are affected.

The Canadian Steel Foundry Company has given contracts for the construction at Welland, Ont., of several new buildings, to cost about \$250,000, and afford employment for about 50 per cent. more labor.

It is expected that the International Tool Steel Company's plant, in Port Hope, Ont., will be completed in June.

Large additions are planned at the Standard Ideal Company's works in Port Hope, Ont.

The Sunbeam Incandescent Company of Canada, Toronto, has purchased land near its present premises, on which to extend its plant. The new building is to cost \$225,000.

Rails for the municipal street railway the City Council of Toronto is to build in certain sections not served by the Toronto Railway Company have been ordered from the United States Steel Products Company.

The Dominion Government is now having the boxes and equipment used in the rural mail delivery service manufactured in Toronto, whereas up to the present it imported the boxes from the United States.

The contract for the 3,300,000-gal. pump, 250-hp. turbine and an electric traveling crane for the equipment of the new water-works pumping station at Welland, Ont., has been awarded by the water commissioners to the Canadian Boring Company, Toronto.

The contract for construction of the new plant of the Page-Hersey Iron Tube & Lead Company, at Welland, Ont., has been awarded to David Dick & Sons, of Welland, at \$151,000.

### Texas

AUSTIN, TEXAS, May 6, 1911.

The continued rains that lasted all through April and during the first few days of the present month caused a temporary dullness of trade that was felt by machinery dealers. It is expected, however, that with the unusually bright prospects that now exist for a good crop season business in all lines will exceed that of any previous year in the history of the State's industrial development. Many large manufacturing and other enterprises that will require considerable machinery are being planned and will probably be in a fair way of consummation before the year comes to a close.

The Clark & Boice Lumber Company, Jefferson, is making improvements to its lumber mill and extending its logging road, preparatory to resuming operations on a larger scale.

The Land Milling Company, Marshall, Mo., and Neodesha, Kan., will install a branch plant at Texarkana at a cost of about \$30,000.

Luckett Bros. are arranging to install a general automobile and machine repair shop at Coleman. The building is now being erected.

The Caney Valley Truck Growers' Association and the Commercial Club of Wharton, are promoting the establishment at that place of a crate, barrel and box factory of a capacity sufficient to meet the demands of the truck growers of that section.

The city of Jacksboro has finished the construction of the new reservoir for its water works system, and the erection of a large standpipe and laying of mains for the distributing system will soon be started. The cost of the improvements will be about \$30,000.

A cotton gin will be built at Bay City by James Rugeley, at a cost of about \$8,000.

The Farmers' Union Gin Company that was recently organized at Walsh, will build a cotton gin. W. G. May, Sam Lester, U. C. Bennett and E. C. Jones are interested.

The City Council of Clarksville is arranging to extend the mains of the water works distributing system and make improvements to the pumping plant. Bonds have been voted for these purposes.

The Southern Hay Press Mfg. Company will establish a large factory at Houston for the manufacture of hay presses. The company's present headquarters are at Silver Creek, Miss.

W. H. Milliken, of Tulsa, Okla., who recently purchased the Black ranch of 22,000 acres, situated near Cotulla, Texas, will construct a large system of irrigation and establish a town upon the land. He has also taken preliminary steps toward the construction of a railroad between Aransas Pass and Eagle Pass, about 300 miles. The route of the proposed line is through his ranch.

The stockholders of the Brenham Cotton Mills, of Brenham, who recently acquired that plant for \$18,500 at sheriff's sale, are preparing to reorganize the company and install new machinery. The mills will be entirely overhauled and placed in operation on an enlarged scale.

Mayor A. P. Wooldridge, of Austin, has under consideration plans for the construction of an extensive sewer system for this city. It is probable that the present private sewer system of the town may be taken over by the city.

The city of Bonham has under consideration the matter of issuing \$30,000 of water works and improvement bonds.

The City Council of Bryan has closed the deal that has been pending for some time for the purchase of the local electric light and power plant. Improvements and extensions will be made to the property.

W. D. Shelly, of Austin, and associates, are promoting the construction of an electric street railroad system for the western part of the city. The proposed line will be about two miles long and will connect a residence district with the business part of the city.

The Whitewright Farmers' Co-operative Ginning Company has been organized with a capital stock of \$6,000 for the purpose of installing a cotton gin at Whitewright. The incorporators are E. Edens, J. L. Denton and A. C. Keeling.

W. M. Grant, of Cleveland, Ohio, will build an ice

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plant and an electric light and power plant at Fort Stockton.

A. B. Crawford, of San Antonio, contemplates an electric light and power plant at Floresville.

Additional machinery will be installed in the municipal water works plant at Brownsville.

The Breckenridge Townsite Company has let the large cotton gin at Clarksville.

The Clarksville Cotton Oil Company will build a contract to A. J. Curry for the construction of a dam 900 ft. long for the purpose of forming a large water storage reservoir at Breckenridge.

The City Council of Pecos is negotiating with the Fountain-Shaw Engineering Company, Dallas, for the construction of a water works system at that place. The water supply will be brought to the city through a pipe line 10 to 14 miles long.

M. B. Goldenberg and associates, who are preparing to construct an extensive system of irrigation near Tucumcari, N. M., are having surveys made with the view of determining the feasibility of running a tunnel through the range of hills two miles east of the proposed dam site and convey the water through it. The dam will be constructed at Pajarita, 10 miles from Tucumcari.

The preliminary contracts for the erection of a beet sugar factory at Portales, N. M., by the American Beet Sugar Company, to cost about \$1,500,000, have been signed. Farmers have pledged the company 30,000 acres of sugar beets. Many irrigation pumping plants will be installed to provide water for the beet crops.

I. G. La Fite, of Denver, Col., who has acquired the electric light and power plant at Tucumcari, N. M., from W. F. Buchanan, W. A. Jackson and W. H. Fuqua, will make improvements and enlargements at a cost of \$10,000.

The taxpayers of Tucumcari, N. M., have voted favorably on the proposition to acquire the local water works plant and distributing system. Bonds to the amount of \$75,000 will be issued to pay for the plant and to make improvements and extensions.

It is announced that good progress is being made with the plans for the construction of a great system of irrigation and the installation of a hydroelectric plant on the Devil's River, near Del Rio, by D. B. Chapin, Edinburg, and associates. The preliminary estimates of the engineers who are making the surveys place the cost of the proposed enterprise at approximately \$4,000,000. It is stated that more than 200,000 acres may be irrigated from one reservoir that is to be formed by constructing a large dam across the river, and that this water power will generate upwards of 50,000 hp. of electrical energy.

William Cameron & Co. have bought a large tract of land in Waco, and will erect a manufacturing plant there.

### The Pacific Coast

SAN FRANCISCO, CAL., May 2, 1911.

April closed with a very satisfactory volume of business in the machine tool trade, and so far the buying movement is well maintained, though reports from many shops indicate rather quiet conditions in manufacturing lines. Most of the sales have been made from the floors of local dealers and no individually notable transactions have been closed. The automobile repair business is more of a feature than for some months past, and while one of these shops only requires three or four small tools, the aggregate of this business is of some importance. Sales of larger tools are only of a scattering nature. A few shops are figuring on some important improvements, but no actual business is likely to result for some time.

While there is no general demand for new wood-working machinery, several orders for large machines of high capacity have been placed by the leading mills. Logging is being resumed on a larger scale in both coast and mountain districts and a renewed demand for general logging equipment is expected within the next month.

The lines of machinery in heaviest demand at present are pumps and gas engines, manufacturers of these articles being fully occupied. Pumping machinery is especially active with the approach of summer, owing to the increasing area of land under irrigation. A good many orders for large pumps are also being placed by mining interests. Gas engines are largely used in connection with pumps, but the use of electric power is increasing in some localities. Business in other lines

continues on about the same scale as last month, with less improvement than was expected. There has been no general demand for road machinery, though considerable activity is anticipated for the summer months.

The creditors' committee in the matter of the G. W. Price Pump Company reports the company's assets at \$48,844 and liabilities at \$75,440.

The George E. Dow Pumping Engine Company is working on a large outfit for the California Oil Fields, Ltd., San Francisco, including a complete fuel oil burning set, a 500 sq. ft. suction surface condenser, a 6½ x 5 x 10-in. horizontal air pump, two 140-hp. Parker water-tube boilers, a 12 and 22 x 10 and 18½ x 18 in. two-stage cross compound steam air compressor, two boiler feed pumps and a 16 and 24 x 5½ x 18-in. horizontal compound duplex crank and flywheel pumping engine.

The furnace building and warehouse of the Illinois-Pacific Glass Works, this city, was destroyed by fire on the morning of May 1. The value of the property destroyed is said to be over \$300,000.

Considerable contractors' equipment will probably be required for work in connection with the Sacramento Valley Irrigation Company, which has asked for bids on the excavation of 1,500,000 cu. yd. of earth on its canal near Willows, Cal. The letting of the work, however, is contingent on the settlement of several right-of-way controversies.

Louis Brenneis and associates, interested in a machine shop at Oxnard, Cal., have incorporated as the Brenneis Mfg. Company, with the object of adding a foundry and enlarging the shops. The company specializes on the manufacture of implements for use in the bean and sugar beet industries.

The Western Refrigerating Company has ordered a lot of ice machinery, etc., for the improvement of its plant at Petaluma, Cal.

The Sunrise Mine, near Placerville, Cal., is remodeling its mill and installing a new 10-stamp outfit.

The King Machine & Mfg. Company has been incorporated at Los Angeles, Cal., with a capital stock of \$50,000 by S. W. King, J. E. Atkins and E. Toley.

The water commissioners of San Bernardino, Cal., have let a contract for a number of pumps and motors to the George E. Dow Pumping Engine Company, San Francisco. Fairbanks-Morse motors will be used.

Cotton Bros., contractors, are equipping their rock crushing plant near Petaluma, Cal., with electric power.

According to a report from Los Angeles, the Riverdale Brokerage Company is preparing to install a lot of coal handling machinery, to be operated by electric power, at Los Angeles Harbor.

The Hartford-Arizona Mining Company, Hamburg, Ariz., is installing a 1½-mile aerial tramway.

The Southern Belle mine, near Randsburg, Cal., will shortly install a pump of 6000 gal. per hour capacity.

The California Motor Car Company has made a proposition to the Chamber of Commerce of Oakland, Cal., in regard to the establishment of an automobile factory in that city. The company is incorporated at \$250,000, those most interested being Walter Sachs, L. Schramm and H. Ball.

Los Angeles county, Cal., has called for bids on a steam shovel for the Pacoima rock quarry. Bids will be opened May 8.

It is reported that Eastern people, whose names have not been given out, are considering the installation of a dry dock and large machine shop at Los Angeles Harbor. Those interested are said to have been negotiating with the Pacific Wharf & Storage Company, of which J. C. Wickham is secretary.

The Union Gas Engine Company, this city, has taken an order for a 200-hp. engine for a steel barge. The hull is being built by the United Engineering Works for the Standard Oil Company.

The Holt Mfg. Company, San Francisco and Stockton, Cal., is having great success with its Caterpillar traction engines. In addition to local business, several large orders have been received from its representative in the Argentine Republic.

The town of Anaheim, Cal., will receive bids May 11 for a steam engine and a 150-kw. generator.

The Northern California Power Company is installing a great many small electric motors in connection with irrigating plants in the Sacramento Valley around Willows, Cal.

Work is to be started in a few days on buildings for a new stove foundry project at Sunnyvale, Cal.

The Universal Mining & Development Company, Los Angeles, Cal., has purchased a mine near San Diego and will install a lot of modern machinery.

# CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

## IRON AND STEEL—

### Bar Iron from Store—

Refined Iron:	
1 to $1\frac{1}{2}$ in. round and square....	\$ Ib 1.75¢
$1\frac{1}{2}$ to 4 in. x $\frac{1}{2}$ to 1 in....	\$ Ib 1.85¢
1 $\frac{1}{2}$ to 4 in. x $\frac{3}{4}$ to 5-1....	\$ Ib 1.85¢
Rods—% and 11-16 round and square....	\$ Ib 1.85¢
Angles:	Cts. \$ Ib
5 in. x $\frac{3}{4}$ in. and larger....	2.00¢
5 in. x 3-16 and $\frac{1}{2}$ in....	2.40¢
1 $\frac{1}{2}$ to $2\frac{1}{2}$ in. x $\frac{3}{4}$ in....	2.15¢
1 $\frac{1}{2}$ to $2\frac{1}{2}$ in. x 3-16 in. and thicker....	2.05¢
1 to $1\frac{1}{2}$ x 3-16 in....	2.15¢
1 to $1\frac{1}{2}$ x $\frac{1}{2}$ in....	2.20¢
$\frac{1}{2}$ x $\frac{1}{2}$ in....	2.30¢
$\frac{1}{2}$ in. x $\frac{3}{4}$ in....	2.35¢
$\frac{1}{2}$ in. x $\frac{1}{2}$ in....	3.55¢
$\frac{1}{2}$ x 3-32 in....	4.00¢
Tees:	
1 in....	2.45¢
$1\frac{1}{2}$ in....	2.30¢
$1\frac{1}{2}$ to $2\frac{1}{2}$ x $\frac{3}{4}$ in....	2.10¢
$1\frac{1}{2}$ to $2\frac{1}{2}$ x 3-16 in....	2.20¢
3 in. and larger....	2.05¢
Beams:	
Channels, 3 in. and larger....	2.00¢
Bands— $1\frac{1}{2}$ to 6 x 3-16 to No. 8....	2.00¢
"Burden's Beat" Iron, base price....	2.15¢
Burden's "H. B & S.", Iron, base price....	2.95¢
Norway Bars....	3.60¢

### Merchant Steel from Store—

Bessemer Machinery....	per lb .19¢
Tire Calk, Tire and Sleigh Shoe....	2.50 @ 3.00¢
Best Cast Steel base price in small lots....	.7¢

### Sheets from Store—

Black,	
One Pass.C.R. R. G. Soft Steel. Cleared....	
No. 16.....	\$ Ib .55¢ .28¢
Nos. 18 to 20.....	\$ Ib 2.70¢ .29¢
Nos. 22 and 24.....	\$ Ib 2.75¢ .30¢
No. 26.....	\$ Ib 2.80¢ .31¢
No. 28.....	\$ Ib 2.95¢ .33¢

### Russia, Planished &c.

Genuine Russia, according to assort- ment....	\$ Ib 12 @ 14 1/4
Patent Planished, W. Dewees Wood....	\$ Ib A. 10¢; B. 9¢ net

### Galvanized

Nos. 12 and 14.....	\$ Ib 2.95¢
Nos. 22 to 24.....	\$ Ib 3.30¢
No. 26.....	\$ Ib 3.50¢
No. 28.....	\$ Ib 3.80¢

No 20 and lighter 36 inches wide, 2¢ higher.

## Genuine Iron Sheets— Galvanized

Nos. 22 and 24.....	\$ Ib 5.75¢
No. 26.....	\$ Ib 6.25¢
No. 28.....	\$ Ib 7.25¢

### Corrugated Roofing—

2 $\frac{1}{2}$ in. corrugated....	Painted. Galvd.
No. 24.....	\$ 100 sq. ft. \$3.85
No. 26.....	\$ 100 sq. ft. 4.00
No. 28.....	\$ 100 sq. ft. 3.75

### Tin Plates—

#### American Charcoal Plates (per box)

"A.A." Charcoal:	
IC. 14 x 20.....	\$6.65
IX. 14 x 20.....	7.99

A. Charcoal:	
IC. 14 x 20.....	\$5.60
IX. 14 x 20.....	5.70

### American Coke Plates—Bessemer—

IC. 14 x 20.....	\$4.50
IX. 14 x 20.....	5.50

### American Terne Plates—

IC. 20 x 28 with an 8 lb. coating....	\$8.70
IX. 20 x 28 with an 8 lb. coating....	10.70

### Seamless Brass Tubes—

List November 13, 1908. Base price, 18¢

### Brass Tubes, Iron Pipe Sizes—

List November 13, 1908. Base price, 18¢

### Copper Tubes—

List November 13, 1908. Base price, 21¢

### Brazed Brass Tubes—

List February 1, 1911. 10 1/4¢ \$ Ib

### High Brass Rods—

List February 1, 1911. 14 1/4¢ \$ Ib

### Roll and Sheet Brass—

List February 1, 1911. 14 1/4¢ \$ Ib

### Brass Wire—

List February 1, 1911. 14 1/4¢ \$ Ib

### Copper Wire—

Base Price, Carload lots mill 13 1/4¢

### Copper Sheets—

Sheet Copper Hot Rolled, 16 oz. (quantity lots) \$ Ib 18¢

Sheet Copper Cold Rolled, 1¢ \$ Ib advance over Hot Rolled.

Sheet Copper Polished 20 in. wide and under, 1¢ \$ Ib square foot.

Sheet Copper Polished over 20 in. wide, 2¢ \$ Ib square foot.

Planished Copper, 1¢ \$ Ib square foot more than Polished.

## METALS—

### Tin—

\$ Ib 45 @ 46¢

### Copper—

\$ Ib 14 @ 14 1/4¢

\$ Ib 13 @ 14 1/4¢

\$ Ib 13 @ 14 1/4¢

### Speier—

Western ..... \$ Ib 6 1/4 @ 6 1/4¢

### Zinc—

No. 9, base, easks... \$ Ib 7 1/4¢ Open... \$ Ib 8 1/4¢

### Lead—

American Pig..... \$ Ib 5 @ 5 1/4¢

Bar ..... \$ Ib 6 @ 6 1/4¢

### Solder—

$\frac{1}{2}$  &  $\frac{1}{4}$ , guaranteed..... \$ Ib 27 1/4 @ 28¢

Refined..... \$ Ib 25 1/4 @ 26¢

Bar..... \$ Ib 23 @ 23 1/4¢

### Antimony—

Per lb ..... \$ Ib .10 @ 10 1/4¢

### Bismuth—

Per lb ..... \$2.00 @ \$2.75

### Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingots for remelting..... \$ Ib 21 1/2 and 23¢

Rods & Wire..... Base Price 31¢

Sheets..... Base Price 33¢

### Old Metals—

Dealers' Purchasing Prices Paid in New York, Cents.

Copper, heavy and crucible..... 10.50 to 10.75

Copper, heavy and wire..... 10.25 to 10.50

Copper, light and bottoms..... 9.25 to 9.50

Brass, heavy..... 7.00 to 7.25

Brass, light..... 5.50 to 5.75

Heavy machine composition..... 9.00 to 9.25

Clean brass turnings..... 6.75 to 7.00

Composition turnings..... 7.75 to 8.00

Lead, heavy..... 3.75

Lead, tea..... 3.50

Zinc, scrap..... 4.00

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